Amendments

Robust Fiber instructions Corrections and additions

2025-03-01

Revision history:

In the Amendments, only the last two revisions are displayed. If information about previous audits is needed, please contact Robust fiber support.

Date	Version	Revised by	Remarks
2025-03-01	1.7	Technical Council, Robust Fiber	Annual Audit
2024-03-01	1.6	Technical Council, Robust Fiber	Annual Audit
2023-10-05	1.5.2	Lars Björkman Technical Council, Robust Fiber	Revision Sub-appendix 4.1 Instructions for connecting portable backup generator to a site. Supplement servis TN-S Consequence update in Appendix 4: Robust site and node.
2023-06-01	1.5.1	Lars Björkman Technical Council, Robust Fiber	Addition of Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site. Consistency update of Main document and Appendix 4 Site and node (ver 1.5.1)
2023-03-01	1.5	Technical Council, Robust Fiber	Annual audit
2022-08-10	1.4.1	Technical Council, Robust Fiber	Revision of the annexes regarding the new Electronic Communications Act and new regulation for security: Main document Appendix 4 Site and nodes Sub-appendix 4.1 Robust sites for digital critical infrastructure protection Sub-appendix 6.1 Checklists, inspection Appendix 7 Fibre installation project
2022-03-01	1.4	Technical Council, Robust Fiber	Revsion of appendix: Main document Appendix 2 Robust networks Sub-appendix 2.1 Robust networks, Attenuation calculation Appendix 3 Robust routing methods Appendix 4 Site och nod Sub-appendix 4.1 Robust sites for digital critical infrastructure protection Sub-appendix 6.1 Checklists, inspection Deleted attachments Sub-appendix 4.1.1 Robust site RSA template Sub-appendix 4.1.2 Robust site Routine and guidance_RSA
2021-09-01	1.3.3	Technical Council, Robust Fiber	Revsion of appendix: Appendix 1 Terms and definitions Appendix 2 Robust networks Appendix 4 Robust sites and nodes
2021-05-07	1.3.2.2	Technical Council, Robust Fiber	Completion of Appendix 6 and Sub-Appendix 6.1 In accordance with PTS requirements in the inspection certificate.
01/03/2021	1.3.2 /1.3.2.1	a) Working group Robust Site b) Working group of inspectors	a) New Sub-appendix for Appendix 4 Robust Site & Nod. Sub-appendix 4.1 Robust Sites for digital critical infrastructure protection and two sub/sub appendix 4.1.1 Robust site RSA (excel) and 4.1.2 Routine and guidance for Risk and vulnerability analysis /RSA). b) Completion of Appendix 6 and Sub-Appendix 6.1 In accordance with SJV requirements in the inspection certificate. Introduced instructions for checking minimum

			requirements that cannot be checked visually. RF. Verified by inspection question to contractor and inspector.
17/08/2020	1.3.2	Technical Council, Robust Fiber	Amendments, supplements and corrections
25/11/2019	1.3.1	Technical Council, Robust Fiber	Amendments, supplements and corrections
01/04/2019	1.3	Technical Council, Robust Fiber	Amendments, supplements and corrections
10/04/2018	1.2	Technical Council, Robust Fiber	Supplements and corrections. Appendix 3
08/04/2018	1.2	Technical Council, Robust Fiber	Supplements and corrections.
03/04/2018	1.2	Technical Council, Robust Fiber	Amendments, supplements and corrections Appendix 4 Sites and nodes
01/04/2018	1.2	Technical Council, Robust Fiber	Amendments, supplements and corrections
15/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Correction of printing errors. Page breaks. Appendix 4
13/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Clarification of texts. Appendix 3
10/03/2017	1.1.1	Jimmy Persson, Robust Fiber	Correction of printing errors. Page breaks. Appendix 2
22/02/2017	1.1	Jimmy Persson, Robust Fiber Lars Björkman, Robust Fiber	
01/07/2016	1.0	The project	Robust fibre installation

Applicable version for each document:

Appendix	Applicable version	Amended date
Main document	V1.7	2025-03-01
Appendix 1: Terms and definitions	V1.7	2025-03-01
Appendix 2: Robust networks	V1.7	2025-03-01
Sub-appendix 2.1 Robust networks, Attenuation calculation	V1.7	2025-03-01
Appendix 3: Robust routing methods	V1.7	2025-03-01
Appendix 4: Robust sites and nodes	V1.7	2025-03-01
Sub-Appendix 4.1 Instructions for connecting portable backup generator to a site.	V1.7	2025-03-01
Appendix 5: Documentation	V1.7	2025-03-01
Appendix 6: Inspection	V1.7	2025-03-01
Sub-appendix 6.1: Checklists, inspection	V1.7	2025-03-01
Appendix 7: Fibre installation projects	V1.7	2025-03-01
Appendix 8: Ledningskollen	V1.7	2025-03-01

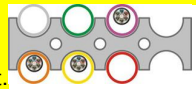
Amendments: Amendments of Instructions for Robust Fiber carried out 1/3 2025

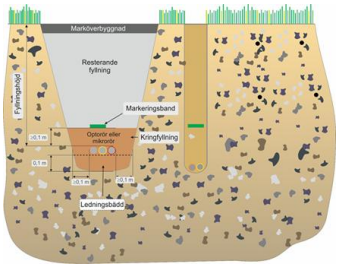
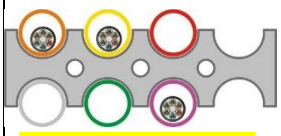
Date 01/03/2025		
Document	Previous text	Addition or revised text
Main document	2.1 Reliability An example of a management model for operational reliability, with templates showing how the network owner can handle the operational reliability work, can be found at the Swedish Local Fibre Alliance, www.ssnf.org.	~~An example of a management model for operational reliability, with templates showing how the network owner can handle the operational reliability work, can be found at the Swedish Local Fibre Alliance, www.ssnf.org.~~ Examples of threat catalogs as well as tools and instructions for the implementation of risk and vulnerability analyzes are gathered under a common place Bashot Telekom with the address: https://stadsnatsforeningen.se/branschstod/robust-digital-infrastructure/
Appendix 1 Terms and definitions	2.3 Ducting Optical fibre chamber: Space level with the ground or buried (underground optical fibre chamber) from which ducts start or terminate or connect two or more sections of duct. Examples of various types of chambers: cable chamber, splicing chamber, intake chamber, pulling chamber, splicing box and loop chamber.	A space with a cover/covering at ground level or buried (so-called optical fibre chamber) from which ducting pipes start or end or connect two or more sections of duct. Examples of names for chambers: cable chamber, splice chamber, intake chamber, draught chamber, splice box and loop chamber.
Appendix 2 Robust networks	2.2.1 Ducts Ducts for direct installation in soil shall, as a rule of thumb, have a thickness of at least 1.8 mm.	Ducts for direct installation in soil shall, as a rule of thumb, have a thickness of at least 1.75 mm.
Appendix 2 Robust networks	2.2.1.1 Standard ducts	Addition: The standard SS-EN 50411-6-1 contains the initial, dimensional, mechanical and environmental performance requirements that an unprotected micropipe is expected to meet.
Appendix 2 Robust networks	2.2.2.1 Optical fibre chambers MINIMUM REQUIREMENTS • Optical fibre chambers must be placed in such a way that the risk of damage during ditch cleaning is minimized.	• (New) The filling height for a optical fibre chamber shall be the distance between the manhole cover and the completed ground surface as shown in the table in Chapter 2.3.3 Minimum filling height. ~~• Optical fibre chambers must be placed in such a way that the risk of damage during ditch cleaning is minimized.~~ • Chambers and chambe markings must not be placed in the bottom of the ditch. Deviations must be approved by the client. • (New) When planning and designing chambers, personal safety must always be in accordance with Boverkets, Building and Planning and EN 124. **Recommendation** ~~• Placement of optical fibre chambers in trenches should be avoided.~~
Appendix 2 Robust networks	*2.2.3.1 Position measurement* **MINIMUM REQUIREMENTS** • Between waypoints, measurements must be performed at intervals of at least every 50 metres within built-up areas and within at least every 100 metres outside of built-up areas.	• Between waypoints, measurements must be made so that the distance between the measuring points is maximum with a point density of at least 50 metres within built-up areas and within at least 100 metres outside built-up areas, and taking into account that accuracy class 2 may be included.
Appendix 2 Robust networks	*2.3.3.1 General requirements regarding minimum backfill height:*	The filling height in the filling height tables has been adjusted to the requirements of EBR KJ 41:21

Appendix 2 Robust networks	2.5.5 Splicing units The fibre optic cable's splice is protected in a splicing unit. Splicing units in the form of splice boxes or splice cabinets are selected according to the environment in which they are placed, the number of fibres to be spliced, as well as the cables and any microducts that are to be connected. Splice boxes are normally intended for direct routing in the ground or optical fibre chambers. Splice cabinets are available for installation outdoors in an outdoor splice cabinet and for installation in an indoor environment. A wall box for outdoor use is a splice cabinet and outdoor splice cabinet in one unit. A facade box is a box located on the facade of a house and used for splicing fibre optic cable for the house. Splice units can also include intermediate pieces and connectors.	2.5.5 Skarvenheter The fibre optic cable's splice is protected in a splicing unit. Splicing units in the form of splice boxes or splice cabinets are selected according to the environment in which they are placed, the number of fibres to be spliced, as well as the cables and any microducts that are to be connected. ~~Splice boxes are normally intended for direct routing in the ground or optical fibre chambers.~~ ~~Splice cabinets are available for installation outdoors in an outdoor splice cabinet and for installation in an indoor environment.~~ ~~A wall box for outdoor use is a splice cabinet and outdoor splice cabinet in one unit.~~ ~~A facade box is a box located on the facade of a house and used for splicing fibre optic cable for the house~~ Splice units are available for various placement options, for example for direct installation in the ground, in ground cabinets, on posts and on walls. Splice units consist of: • Extension cabinet • Splice boxes • Wall boxes • Façade boxes Splice units can also include intermediate pieces and connectors. Supplement minimum requirements *For splice units that are accessible to the public, a risk assessment must be carried out to determine the need for protection against external mechanical influences.Tillägg minimikrav
Appendix 2 Robust networks	2.5.12 Delivery measurement of passive fibre	Addition: The chosen method, unidirectional OTDR measurement, is based on the fact that it is an acceptable estimation of attenuation for the type of services that are relevant for a residential connection. If the limit value is exceeded, bidirectional measurement must be performed.
Appendix3 Robust routing methods	3.12 Trees, roots and vegetation Any required pruning of trees and bushes must be carried out in a professional manner.	The required pruning and protection of roots for trees and shrubs must be carried out in a professional manner.
Appendix 4 Robus site and node	Appendix 9 Guidance for installation of switching equipment and fiber in site, has been integrated in appendix 4.	Appendix 4 Robus site and node has been supplemented with guidelines for installed customer equipment and cross-connection cables and has been consequence adjusted. 1. Introduction The appendix also contains recommendations and examples of what it can look like both outdoors and indoors, as well as guides for installing customer equipment and cross-connection. 2.2.3 Type of site or node 2.2.4.1 General 2.2.4.2. Interior design and space requirements 2.2.4.3 Equipment cabinets and racks (New Chapter) 2.2.4.4 Cable routing (New Chapter) 2.2.4.5 Contact Numbering ODF Device (New Chapter) 2.2.5 Electrical installation 2.2.5.1 Electrical system 2.2.6.1 Lightning protction 2.2.6.2 Equipotential bonding 2.2.7 Environment and climate regulation 2.2.8 Dust, dirt and moisture 3. Guidance for collocated customer equipment (New chapter) 4. Cross connection cable guidance (New chapter)
Appendix 5 Documentation	2.5 Management of documentation **Minimum requirements for management:** • The electronic version of the	• The electronic version of the documentation must be stored in such a way that the risk of it being lost is minimised. ~~It is recommended to have backups in at~~

	documentation must be stored in such a way that the risk of it being lost is minimised. It is recommended to have backups in at least two different physical locations.	~~least two different physical locations.~~ **Recommendation** It is recommended to have backups in at least two different physical locations and that re-reading is carried out annually.
Sub-Appendix 6.1 Checklist		Column for Approved added. PTS requirements adjusted.

Amendments: Amendments of Instructions for Robust Fiber carried out 1/3 2024

Date 01/03/2024		
Document	Previous text	Addition or revised text
Appendix 2 Robust networks	2.2.1 Ducts **MINIMUM REQUIREMENTS, DUCTS:** Annular rigidity and wall thickness must be of the correct dimensions for the conditions the ducts have to handle after routing. The manufacturer's specifications must be followed.	**MINIMUM REQUIREMENTS, DUCTS:** Annular rigidity and wall thickness must adopted ~~be of the correct dimensions~~ for the conditions the ducts have to handle after routing. The manufacturer's specifications must be followed.
Appendix 2 Robust networks	2.2.1 Ducts When selecting ducts for routing in the ground, consideration is given to the ground conditions where routing is to take place, the method with which the ducts are to be routed and that the ducts are appropriate for the technique that is to be used to install the fibre optic cable.	2.2.1 Kanalisationsrör When selecting ducts for routing in the ground, consideration is given to the ground conditions where routing is to take place, the method with which the ducts are to be routed and that the ducts are appropriate for the technique that is to be used to install the fibre optic cable. In shafts with many pipes, spacers can be used to maintain the position of the pipes in the shaft. 
Appendix 2 Robust networks	2.2.3.1 Position measurement **MINIMUM REQUIREMENTS, POSITION MEASUREMENT:** Measurement must be carried out with accuracy class 2 (< 0.25 metres) or even greater precision. For this reason, it may be necessary in certain cases to measure the actual position before the trench is refilled in order to ensure the quality of the measurement.	**MINIMUM REQUIREMENTS, POSITION MEASUREMENT:** Measurement must be carried out with accuracy class 2 (< 0.25 metres) or even greater precision*. For this reason, it may be necessary in certain cases to measure the actual position before the trench is refilled in order to ensure the quality of the measurement. * Note. Please note that the required accuracy can be difficult to achieve in dense forests.
Appendix 2 Robust networks	2.2.3.1 Position measurement **MINIMUM REQUIREMENTS, POSITION MEASUREMENT:** • The fibre installation must be measured, i.e. ducts, all termination points for ducts, cabinets, optical fibre chambers and cable trays, ducts end points as well as cable fixation points. For optical fibre chambers, cabinets and cable trays, the mid-point must be measured.	**MINIMUM REQUIREMENTS, POSITION MEASUREMENT:** • The fibre installation must be measured, i.e. ducts, all termination points for ducts, cabinets, optical fibre chambers ~~and cable trays~~, ducts end points as well as cable fixation points. • The position of the ends of ducts that are left in the ground for future use must be measured. For optical fibre chambers, cabinets and ~~cable trays~~, the mid-point must be measured.
Appendix 2 Robust networks	2.2.3.2 Marking In order to simplify traceability search wire should be used. Alternatively, a separate search wire can be routed above or below the ducts.	In order to simplify traceability search wire should be used. Alternatively, a separate search wire can be routed above or below the ducts in accordance with the requirements of the network owner.
Appendix 2 Robust networks	2.2.3.2 Marking • The search wire's sub-section may not exceed 500 m when crossing electricity	**MINIMIKRAV OM SÖKTRÅD ANVÄNDS:** In the case of a power line higher than 130 kV, the distance of a search wire must not exceed 500 m if it

	lines greater than 130 kV or in the case of extended distances parallel with and closer than 150 m to an electricity line greater than 130 kV. .	crosses the power line or if it runs parallel to the power line closer than 150 m. Always contact the electricity network owner for a risk analysis when a crossing or parallel route is required.
Appendix 2 Robust networks	2.2.3.2 Marking **MINIMUM REQUIREMENTS IF SEARCH WIRE IS USED:** • The search wire must be spliced in accordance with the supplier's regulations using tools and splicing accessories designated for this purpose.	**MINIMUM REQUIREMENTS IF SEARCH WIRE IS USED:** The search wire must be spliced in accordance with the supplier's regulations using tools and splicing accessories designated for this purpose. The splice clamp must be designed for the diameter of the search wire and the joint must be sealed against water. Check solution options with the network owner.
Appendix 2 Robust networks	*2.3.2 Underground routing* **MINIMUM REQUIREMENTS FOR UNDERGROUND ROUTING:** When pressing through a railway bank, the Swedish Transport Administration's instructions must be followed.	**MINIMUM REQUIREMENTS FOR UNDERGROUND ROUTING:** When pressing through a railway bank, the ~~Swedish Transport Administration's~~ track/Railway Operator's instructions must be followed.
Appendix 2 Robust networks	*2.3.2.1 Bed in ducts*  Felaktigt utförd kringfyllning riskerar att rören kan tryckas ihop när återfyllnadsmassorna komprimeras. För att bibehålla distansen mellan rören vid komprimeringen rekommenderas också distanshållare för kanalisationsrören. 	Incorrectly conducted backfilling entails a risk of the ducts being pressed together when the refill material is compressed. In order to maintain the distance between the ducts during compression, spacers are also recommended for the ducts.  Moved to 2.2.1 Ducting
Appendix 2 Robust networks	*2.3.2.2 Positioning of optical fibre chambers and cabinets* **MINIMUM REQUIREMENTS WHEN POSITIONING OUTDOOR GROUND CABINETS:** Outdoor ground cabinets must, considering any risk of danger to persons during installation and servicing, be installed with the cabinet opening facing the street/road.	**MINIMIKRAV VID SÄTTNING AV MARKSKÅP:** Outdoor ground cabinets must always be placed, considering any risk of danger to persons during installation and servicing. ~~installed with the cabinet opening facing the street/road.~~
Appendix 2 Robust networks	*2.3.2.6 Backfill masses.* **MINIMUM REQUIREMENTS FOR FILLING MASSES** • Backfill surrounding Backfill surrounding shall be at least 0.1 m thick at the side, and over ducts calculated from the top edge of the coarsest pipe. Backfill surranding shall consist of unbroken or crushed material with 0–8 mm grain size.	**MINIMUM REQUIREMENTS FOR FILLING MASSES** • Backfill surrounding Backfill surrounding shall be at least 0.1 m thick at the side, and over ducts calculated from the top edge of the coarsest pipe. Backfill surranding shall consist of unbroken or crushed material, or existing masses, with 0–8 mm grain size.
Appendix 2 Robust networks	*2.3.2.6 Backfill masses.* **MINIMUM REQUIREMENTS FOR FILLING MASSES** • **Remaining filling** For the remaining filling of the shaft, filling mass is used which closest to the	**MINIMUM REQUIREMENTS FOR FILLING MASSES** **Remaining filling** For the remaining filling of the shaft, filling mass is used which closest to the duct / cable protection does not contain stones with sharp edges which can damage the cable in the event of soil compaction, spring thaw

	duct / cable protection does not contain stones with sharp edges and where a maximum of 10 % consists of the grain size of 100–150 mm.	and traffic loads. The remaining filling should not contain more then ~~and where a maximum of~~ 10 % ~~consists~~ of the grain size of 100–150 mm.
Appendix 2 Robust networks	*2.3.3.1 General requirements regarding minimum backfill height:* **Minimums backfill height requirements** • When pressing through a road or railway embankment, the road operator's and the Swedish Transport Administration's regulations must be followed.	**Minimums backfill height requirements** • When pressing through a road or railway embankment, the road operator's and the track/Railway Operator's regulations must be followed.
Appendix 2 Robust networks	*2.3.4.1 Intake of duct above ground level in property* **MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS ABOVE GROUND LEVEL:** • Cable protection that can cope with an outdoor environment must be used to cover visible duct on house walls. UV-sensetiv duct pipes must have mechanical protection (e.g., sheet metal chute) that cover the duct pipe so that the pipe is protected against both mechanical damage and UV light along its entire lenght.	**INTAKE OF DUCTS ABOVE GROUND LEVEL:** • ~~Cable protection that can cope with an outdoor environment must be used to cover visible duct on house walls.~~ • ~~UV-sensetiv~~ Duct pipes must have mechanical protection (e.g., sheet metal chute) that cover the duct pipe so that the pipe is protected against both mechanical damage and UV light along its entire lenght.
Appendix 2 Robust networks	*2.3.4.1 Intake of duct above ground level in property* **MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS ABOVE GROUND LEVEL:** • For the cable insertion into the house, a hole must be drilled at an incline of at least 30°, with the highest point inside the house. • Ducts must be sealed against the hole through the housewall. The space around the duct must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal.	**MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS ABOVE GROUND LEVEL:** • For the cable insertion into the house, a hole must be drilled at an incline of at least 30°, with the highest point inside the house*. • Ducts must be sealed against the hole through the housewall. The space around the duct must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal*. *When drilling and sealing penetrations, the applicable building standards and construction rules for the property must be applied.
Appendix 2 Robust networks	*2.3.4.2 Intake of duct below ground level* **MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCT BELOW GROUND LEVEL:** • A hole must be drilled into the house at an incline of at least 30°, with the highest point inside the property. If the hole is drilled through the foundation's existing drainage protection, the protection must not be impaired, rather it must be reinstated. • The duct must be sealed against the hole through the building foundations. The space around the duct must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal.	**MINIMUM REQUIREMENTS REGARDING INTAKE OF DUCTS BELOW GROUND LEVEL:** • A hole must be drilled into the house at an incline of at least 30°, with the highest point inside the property. If the hole is drilled through the foundation's existing drainage protection, the protection must not be impaired, rather it must be reinstated*. • The duct must be sealed against the hole through the building foundations. The space around the duct must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal*. *When drilling and sealing penetrations, the applicable building standards and construction rules for the property must be applied.
Appendix 2 Robust networks	2.3.5 Routing in lakes and watercourses **MINIMUM REQUIREMENTS WHEN ROUTING IN LAKES AND WATERCOURSES:**	**MINIMUM REQUIREMENTS WHEN ROUTING IN LAKES AND WATERCOURSES:** When crossing other ducts, such as water and sewage ducts , ~~the duct/underwater cable must be routed~~

	When crossing other ducts, such as water and sewage ducts, the duct/underwater cable must be routed under these. If this is to difficult to implement, an alternative solution crossing agreement shall be drawn up with the relevant cable owner(s)..	~~under these. If this is to difficult to implement, an alternative solution~~ a crossing agreement shall be drawn up with the relevant cable owner
Bilaga 2 Robusta nät	2.3.6 Routing on poles From a robustness perspective, routing on poles should be avoided. X X x **MINIMUM REQUIREMENTS FOR ROUTING ON POLES:** • Ensure that the owner of the pole route has procedures for clearing the cable corridor to prevent damage from trees and branches. • Guys must be present to counteract lateral forces in the event of branching or bends.	From a robustness perspective, routing on poles should be avoided. When it comes to laying ducting and fiber cable on poles, this is mainly done in connection and local networks. To determine if it is an option, several factors should be considered: • **Terrain and topography** **Is the route hilly, difficult to access and/or mountainous/stony?** • **Permits and regulations** Are there rules for how the reception centre may be installed for aesthetic, environmental or other reasons? • **Risk of injury** Is there a risk of weather-related damage or sabotage along the route? • **Joint construction** Is the electricity network to or in the area located on poles or is it required to have your own poles. Liability issues, boundaries and maintenance measures must be clarified and documented in an agreement between the holders. • **Costs** Are the costs of installation and maintenance reasonable compared to buried facilities? **MINIMUM REQUIREMENTS FOR ROUTING ON POLES:** • Ensure the route has procedures for clearing the cable corridor to prevent damage from trees and branches. • Guys must be present to counteract lateral forces in the event of branching or bends. The supplier's installation instructions must be followed.
Appendix 2 Robust networks	2.4.1 Fibre optic cables, general Examples of various fibre optic cables 1-11	241 Addition to option 8 ADSS cables (All Dielectric Self-Supporting cable /ADSS) are an alternative to cables with built-in support, OPGW (optical ground wire) and OPAC (optical attached cable) but have lower installation costs The cables are designed to be strong enough to be installed in lengths of up to 700 meters between cable supports and are designed to be light and small to reduce the load on the cable support due to cable weight, wind and ice
Appendix 2 Robust networks	2.4.3 Fibre optic cables, cable gutters and cable ladders for indoor routing **MINIMUM REQUIREMENTS FOR FIBRE OPTIC CABLES FOR INDOOR ROUTING:** Ducts and fibre optic cables intended solely for outdoor use may not extend by more than 20 m into a building and must remain within the same fire cell, according to Boverket's (National Board of Housing, Building and Planning) CPR	**MINIMUM REQUIREMENTS FOR FIBRE OPTIC CABLES FOR INDOOR ROUTING:** Ducts and fibre optic cables intended solely for outdoor use only may have a maximum length of 20 m ~~may not extend by more than 20 m~~ into a building and must remain within the same fire cell, according to Boverket's (National Board of Housing, Building and Planning) CPR class Dca-s2, d2, a2, valid from 2017. After this, ducts and fibre optic cables classified for indoor use must be used.

	class Dca-s2, d2, a2, valid from 2017. After this, ducts and fibre optic cables classified for indoor use must be used.	
Appendix 2 Robust networks	2.5.6.1 ODF (Optical Distribution Frame) An ODF unit is often 19 inches wide and its height can range from 1U (height unit) up to 3U. An ODF can comprise everything from an individual ODF unit with a small number of connectors to covering many units in several racks where all fibre optic cables in the node are terminated.	~~An ODF can comprise everything from an individual ODF unit with a small number of connectors to covering many units in several racks where all fibre optic cables in the node are terminated.~~ An ODF unit (also known as an ODF module or ODF panel) is part of an ODF. Incoming fiber to the node is terminated with a connector on the inside of the ODF unit and the capacity of the fiber is accessed on the front of the ODF unit.
Appendix3 Robust routing methods	4.8 Directional drilling **MINIMUM REQUIREMENTS FOR DIRECTIONAL DRILLING:** Measurement must be conducted to ascertain position and depth. (X and Y coordinates). The depth of laying with a reasonable number of measuring points shall be indicated in a drilling protocol.	**MINIMUM REQUIREMENTS FOR DIRECTIONAL DRILLING:** • Measurement must be conducted to ascertain position ~~and depth~~. (X and Y coordinates). The depth of laying with a reasonable number of measuring points shall be indicated in a drilling protocol.
Appendix 4 Robus site and node	2.2.3.2 Technical shelter They can be placed on a cast foundation or stand on plinths.	~~They can be placed on a cast foundation or stand on plinths.~~
Appendix 4 Robus site and node	2.2.5.1 Electrical system **MINIMUM REQUIREMENTS REGARDING ELECTRICAL SYSTEM:** • Distribution boards in the site must be adapted for 230/400 V as a TN-S system. • Distribution boards must be grouped and fused for each group. Service outlets must be supplied with RCBOs.	**MINIMUM REQUIREMENTS REGARDING ELECTRICAL SYSTEM:** • Service outlets only, i.e. all outlets in the node that are not specifically intended for communication equipment (and rectifiers/UPS that supply power to it) must be supplied with RCBOs. (Residual current circuit breaker with built-in overcurrent protection)
Appendix 4 Robus site and node	2.2.8 Dust, dirt and moisture **MINIMUM REQUIREMENTS FOR MOISTURE PROTECTION:** • A site or node in a building must be fitted with raised thresholds where there is a risk of flooding.	**MINIMUM REQUIREMENTS FOR MOISTURE PROTECTION:** • ~~A site or node in a building must be fitted with raised thresholds where there is a risk of flooding.~~ • Sites or nodes located where there is a risk of flooding must be provided with elevated thresholds.
Appendix 4 Robus site and node	2.2.14 Other **MINIMUM REQUIREMENTS FOR SIGNS:** • There should not be any signs specifying the site's owner etc.	Note. Observe any requirements and regulations regarding marking in camera surveillance.
Appendix 5 Documen-tation	2.1 General requirements For example, the documentation may be available in a system intended for the documentation of fibre installations. Alternatively, different parts of the documentation may comprise different file formats, such as Excel, Word, etc. Files of the type .pdf must not be used as originals as they are not editable.	For example, the documentation may be available in a system intended for the documentation of fibre installations. Alternatively, different parts of the documentation may comprise different file formats, such as Excel, Word, etc. ~~Files of the type .pdf must not be used as originals as they are not editable.~~ The documentation must be handled in a documentation system and with a file format agreed between the client and the contractor
Appendix 6 Inspection	*3.2 Inspection of a facility that has received state support* If the facility has received broadband support from the Swedish Post and Telecom Agency or the Swedish Board of Agriculture, Appendix 6.1 Checklist final inspection is used.	If the facility has received broadband support from the Swedish Post and Telecom Authority (PTS) or the Swedish Board of Agriculture (SJV), the inspector must be used Appendix 6.1 Checklist final inspection.
Appendix 6 Inspection	*3.9 Final inspection* **Review with representatives of the client and the contractor:**	**Review with representatives of the client and the contractor:** • Review of notes regarding deficiencies in respect of duct bedding, number of ducts, cable marking,

	• Review of notes regarding deficiencies in respect of duct bedding, number of ducts, cable marking, backfilling and backfill height. The inspection plan is supplemented with a check of deficiencies that are to be rectified. • Review of notes regarding deficiencies relating to normal restoration (e.g. deficiencies in respect of gravel, asphalt, slabs and grass). The inspection plan is supplemented with a check of faults and deficiencies that are to be rectified.	backfilling and backfill height. ~~The inspection plan is supplemented with a check of deficiencies that are to be rectified~~. The inspection plan is supplemented by checking noted deficiencies • Review of notes regarding deficiencies relating to normal restoration (e.g. deficiencies in respect of gravel, asphalt, slabs and grass). ~~The inspection plan is supplemented with a check of faults anddeficiencies that are to be rectified.~~ The inspection plan is supplemented by checking noted deficiencies
Appendix 6 Inspection	*3.10 Inspection report* When the final inspection is complete, the inspector prepared an inspection report (inspection statement), which is distributed to the parties. **Noteringar**	When the final inspection is complete, the inspector prepared an inspection report (inspection statement), which is distributed to the parties without delay and no later than three weeks after the inspection.
Appendix 6 Inspection	*3.10 Inspection report* **MINIMUM REQUIREMENTS REGARDING WHAT IS TO BE SET OUT IN THE INSPECTION REPORT:** **Participants** representatives for each party, other participants and the inspector	**MINIMUM REQUIREMENTS REGARDING WHAT IS TO BE SET OUT IN THE INSPECTION REPORT:** **Participants** ~~representatives for each party, other participants and the inspector~~ persons present with information on who is bringing each party's claim, the inspector and who appointed him.
Appendix 6 Inspection	*3.12 Warranty inspection*	new point AB/ABT: responsibility period 10 years after contract approval. Begins with a 5-year warranty period for the contract (unless otherwise stipulated in the contract documents) For warranty period regarding material, see AB04/ABT06 in accordance with contract form and contract documents.
Appendix 8 Lednings-kollen		New version
Sub-Appendix 6.1 Checklist		New version
Sub-Appendix 6.1 Checklist		New version

Amendments: Amendments of Instructions for Robust Fiber carried out 5/10/2023

Date 05/10/2023		
Document	Previous text	Addition or revised text
Sub-appendix 4.1 Instructions for connecting portable backup generator to a site.		2.6 Wiring Supplemented with wiring diagram for connection of portable backup generator to a site of the distribution system TN-S
Appendix 4: Robust sites and nodes		2.2.5.2. Auxiliary power systems Addendum to Recommendation For complete information on the connection of portable backup generators to the site, see Sub-appendix 4.1 Instructions for the connection of standby generators in the site.