**Instructions for Robust Fiber  
Sub-appendix 6.1 Checklist for final inspection**

**Ver. 1.3.1**



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# 1. Checklist for final inspection, appendix Networks

**Installation: ……………………..**

Client: …………………….

Contractor: …………………….

Present: …………………….……………………. (representative for the client)

………………….……………………. (representative for the contractor)

………………….……………………. (inspector)

Minimum requirements in respect of execution, labelling and documentation according to   
*“Instructions for Robust Fiber”*, Appendix Robust networks:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Approved** | **Not approved** | **Remarks** | **Comment** |
| **2.1.2 Land investigation** | | | | |
| Visual inspection prior to implementation must be conducted and reported. |  |  |  |  |
| **2.1.3 Permits** | | | | |
| Necessary permits must have been obtained by the contractor. |  |  |  |  |
| Local regulations must have been complied with. |  |  |  |  |
| Land agreement must have been drawn up between the network owner and affected land owners/road operators. |  |  |  |  |
| **2.2.1 Ducts** | | | | |
| The contractor’s choice of splices and ducts must satisfy the minimum requirements. |  |  |  |  |
| Where there is a risk of attack by pests, ducts with high resistance to attack must be selected. Alternatively, additional protection must be installed outside the existing ducts. |  |  |  |  |
| **2.2.2.1 Cable** manhole | | | | |
| The manhole type must be designed for the environment in which it is located, e.g. roadway, pavement or buried in a greenfield site. |  |  |  |  |
| When choosing a manhole, consideration must be given to the types of ducts and fibre optic cables that may be installed in the manhole, bearing in mind minimum bend radius, type of splice box as well as the number of ducts and fibre optic cables. |  |  | Inspection must be performed to ascertain that there is sufficient space. |  |
| Visible manholes (not covered) must be locked to prevent unauthorised access. |  |  |  |  |
| The contents of the manhole must not be evident from the outside of the manhole. |  |  |  |  |
| **2.2.2.2 – 2.2.2.3 Outdoor splice cabinets** | | | | |
| The cabinet must be of class IP34 or higher. The cabinet be of class IK10 or equivalent. The cabinet must be of corrosion class C3. |  |  |  |  |
| Outdoor splice cabinets must be locked mechanically or electromechanically. |  |  |  |  |
| If a cabinet has been supplied with a ground insulation plate, this must always be installed in accordance with the manufacturer’s instructions. All openings between the plate and cabinet, cable and other bushings must be sealed. |  |  |  |  |
| If a cabinet has been supplied without a ground insulation plate, some other ground insulation must be installed, e.g. in the form of Leca granules. Where Leca granules are used, the backfill must be at least 35 cm thick and must reach above ground level. |  |  |  |  |
| The sealing of ducts in outdoor splice cabinets must be performed above the ground insulation plate or other insulation, and must be carried out through mechanical sealing that is appropriate for the ducts in question. |  |  |  |  |
| In the event thick-walled microducts that are bundled through a plastic casing are used, this must be cut during installation in the outdoor splice cabinet. |  |  |  |  |
| **2.2.3.1 Position measurement** | | | | |
| Measurement of the position of the fibre installation must be carried out using geodetic measurement with a DGPS (differential GPS) measuring instrument. |  |  | During final inspection, it is necessary to check that position measurement has been conducted. |  |
| Check accuracy class and coordinate system. |  |  |  |  |
| Check that the distance between measurement points is correct. |  |  |  |  |
| Check that the positions of the ends of ducts left in the ground have been measured. |  |  |  |  |
| **2.2.3.2 Marking. Cable marking in the ground if search string is used** | | | | |
| Checking that marking, warning mesh or other clear marking has been used. |  |  |  |  |
| The search wire must be accessible (at screw or similar) in nodes, manhole, cabinets or cable fixation points. |  |  |  |  |
| Each sub-section with search wire must not exceed 1,000 metres, as cable locators can normally only manage 500–700 metres. |  |  | During final inspection, the length of the relevant sections must be checked |  |
| The search wire’s sub-section may not exceed 500 m when crossing electricity 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. |  |  | During final inspection, the length of the relevant sections must be checked |  |
| If there are several search wires in the same location, these must be labelled to indicate which section the search wire is following. |  |  |  |  |
| When crossing (drilling/pressing) roads where the fiber optic cable is routed in ducts, the search wire must be included in the ducting. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| **2.3.1 Sealing of ducts** | | | | |
| Ducts must be sealed so that dirt and water cannot penetrate into the ducts. This applies to all end points where new or existing **ducts** are used. The seals must be able to cope with a water column of at least 5 m. |  |  | Checked during final inspection |  |
| The **duct** ends in any sub-ducting (**ducts** arranged within an existing duct) must be properly sealed during and after installation. |  |  | Checked during final inspection |  |
| **2.3.2 Underground routing** | | | | |
| Asphalt must not be laid on top of cable manholes. |  |  |  |  |
| In snowy areas or in the case of dense vegetation, outdoor splice cabinets must be supplied with a marker rod to avoid collision damage and to make the cabinets easier to find. |  |  | During final inspection, it is necessary to check that marker rods are present where this is justified. |  |
| Labelling of outdoor splice cabinets must be performed in accordance with the client’s instructions, and must have taken place in a way that ensures that the content is not disclosed. |  |  |  |  |
| Avoid placing manholes in dips due to the risk of water penetration. |  |  |  |  |
| When pressing through a road or railway embankment, the road operator’s and the Swedish Transport Administration’s regulations must be followed. |  |  | Check that relevant regulations are complied with. |  |
| **2.3.2 Underground routing. Duct intersections in event of requirement for redundancy** | | | | |
| Duct intersections must be arranged at a 90° angle. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| One metre before and after the intersection, special mechanical protection must be arranged if the distance between the ducts is less than 2 metres (e.g. vertically). Special mechanical protection means some form of excavation-safe protection, e.g. a 10 mm thick steel plate or equivalent. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| **2.3.3 Minimum backfill height** | | | | |
| The minimum backfill height must be in accordance with the table. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| Where **ducts** cross smaller roads, such as farm roads, country roads or forest roads, the backfill height must be at least  70 cm. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| Where **ducts** passes a ditch, check that the backfill height is at least 55 cm, calculated from the cleared ditch bottom. |  |  |  |  |
| When pressing through a road or railway embankment, the road operator’s and the Swedish Transport Administration’s regulations must be followed. |  |  | Check that relevant regulations are complied with. |  |
| **2.3.4.1 Intake of ducts above ground level in property** | | | | |
| The bend radius of standard ducts must be at least 20 times the duct’s outer diameter, while the bend radius of microducts must be at least 10 times the **duct´s** outer diameter. If not, drawing the fibre optic cable through the **duct** is rendered more difficult or, in the worst-case scenario, impossible. |  |  |  |  |
| At building foundations, the duct must terminate at least 10 cm above ground level. |  |  |  |  |
| For introduction into the property, a hole must be drilled at an incline of at least 30°, with the highest point inside the property. |  |  |  |  |
| Ducts must be sealed against the fibre optic cable in the fibre outlet to prevent water leaking in from the duct. |  |  |  |  |
| Ducts must be sealed against the hole through the building wall. The space around the duct must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal. |  |  |  |  |
| The ends of ducts must be sealed as close to the inner wall as possible to prevent dirt or similar penetrating, until the optical cable is routed. Ducts must also be sealed after fibre installation. |  |  |  |  |
| Cable protection that can cope with an outdoor environment must be used to cover visible ducting on house walls. |  |  |  |  |
| Marking tape must be placed up to the building shell. |  |  | Check if possible |  |
| Any search wire must be terminated at a screw or cable protection at the building shell. |  |  |  |  |
| Ducts must be UV-protected where they are exposed to direct sunlight. Otherwise, mechanical protection (e.g. sheet metal chute) must cover the duct. |  |  | Mechanical protection must be checked during final inspection. |  |
| If an overhead cable has been routed, check that the supplier’s instructions have been followed. |  |  |  |  |
| **2.3.4.2 Intake of ducts below ground level** | | | | |
| A hole must be drilled into the property 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 ducting must therefore be sufficiently large to provide space for a sufficient amount of sealing compound or a mechanical seal. |  |  |  |  |
| The ends of duct must be sealed until the fibre optic cable is routed to prevent dirt or similar penetrating. The duct must also be sealed after fibre installation. |  |  |  |  |
| Marking tape must be placed up to the building shell. |  |  | Check if possible |  |
| Any search wire must be terminated at a screw at the building shell. |  |  |  |  |
| **2.3.5 Routing in lakes or watercourses** | | | | |
| When routing submarine cables, a loop must be located at both land attachments, ideally around the outside of a cement ring or equivalent, which then also has an anchoring function. |  |  | During final inspection, check that loops are present. | In the event of regulated maritime transport, the routing must be checked by divers. |
| Check that the prescribed cable marking and signs have been executed. |  |  |  |  |
| **2.3.6.1 Joint construction** | | | | |
| The regulations of other cable owners must be complied with. |  |  |  |  |
| **2.3.6.2 Height above ground of overhead cables** | | | | |
| The minimum height above ground or water of overhead cables must not be less than 3.5 metres. From the final pole to the building, however, the height may be less. |  |  | During final inspection, check that the minimum height above ground is at least 3.5 metres. |  |
| In the case of land where vehicles may pass, such as arable land, agricultural land or park environment, the minimum height above ground must be 5 m. Consultation must be held with landowners before installation is carried out. |  |  |  |  |
| The minimum height of the overhead cables over a public road or other area with passing traffic, the installation must be carried out in accordance with the Swedish Transport Administration's instructions for management work within the road area or other road maintenance instructions. Responsible road maintenance requirements always apply before Robust fiber's instructions if the requirement is higher |  |  |  |  |
| An overhead cable within an area where there is maritime transport must be routed at the minimum height above the normal high water level that the Swedish Maritime Administration prescribes for each individual case or that is specified in the concession decision. However, the cable must always be routed at a minimum height of 6 metres. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| When an overhead cable crosses an electrified railway, it must be routed at the height and in accordance with the instructions determined by the National Electrical Safety Board following consultation with the railway’s owners. |  |  | Cannot be inspected.  Verified through control question to contractor and controller. |  |
| In the event of joint construction of fibre optic cables on poles, EBR K30:04 must have been used. |  |  |  |  |
| In the case of overhead cables, inspection must take place according to the pole owner’s and the supplier’s instructions. |  |  |  |  |
| **2.3.7 Installation at bridges** | | | | |
| The ducts must be securely attached and well protected. |  |  |  |  |
| There must be a cable loop on at least one side of the bridge. |  |  |  |  |
| **2.3.8 Routing in tunnels or culverts** | | | | |
| Material that is used must be classified for indoor use. |  |  |  |  |
| Fibre optic cables or ducts must be placed on a cable ladder or clamped to the tunnel wall. Fibre optic cables or ducts must be secured with e.g. cable ties, in which case at least every third cable tie must be made of metal to prevent the cable falling down in the event of a fire. |  |  |  |  |
| If there is a risk of unauthorised entry, vandalism or pests, armoured fibre optic cables or ducts must be used. |  |  |  |  |
| **2.4.2 Fibre optic cables for underground routing** | | | | |
| The fibre optic cable must be routed in ducts |  |  |  |  |
| **2.4.3 Fibre optic cables for indoor routing** | | | | |
| Duct and fibre optic cable intended solely for outdoor use may not extend by more than 20 m into a building and within the same fire cell. After this, ducts and fibre optic cables classified for indoor use must be used. |  |  |  |  |
| **2.4.4 Fibre optic cables for pole routing** | | | | |
| The pole owner’s rules and instruction will apply and may vary depending on local regulations, the use of the pole route (electricity, telecommunications), etc. |  |  | During final inspection, check that other cable owners’ regulations are followed. |  |
| **2.4.6 Fibre optic cables for routing in tunnels and culverts** | | | | |
| If there is a risk of unauthorised entry, vandalism or pests, reinforced fibre optic cables or ducts must be used. |  |  |  |  |
| **2.5.1 Cable management. General requirements** | | | | |
| Loops must be placed at distribution points where future earthworks can be anticipated, for example by large ditches, roads and in the vicinity of urban areas where development can be expected to take place. Length and location of loops must be documented. |  |  | During final inspection, check that the length and location of loops are documented. |  |
| The ends of all non-terminated cables must be sealed. |  |  |  |  |
| **2.5.2 Routing fibre optic cable in manholes and cabinets** | | | | |
| If individual fibres, fibre units, fibre ribbons or bundled fibres are used, these must never be looped freely in manholes as there is a risk of fibre breaks and moisture damage.  They must be looped in a splice box. |  |  | During final inspection, check that looping has been performed in the splice box. |  |
| **2.5.3 Routing fibre optic cable indoors** | | | | |
| When there is a risk of unauthorised entry, vandalism or sabotage, indoor fibre optic cables must be protected mechanically with ducts or equivalent. |  |  |  |  |
| **2.5.5 Splicing units** | | | | |
| Splicing and wall boxes must satisfy at least IP68 and IK8, and must be UV-resistant. |  |  |  |  |
| Facade boxes must satisfy at least IP54 and IK7, and must be UV-resistant. |  |  |  |  |
| Splice cabinets must satisfy at least IP34 and IK8, and must be UV-resistant. |  |  |  |  |
| **2.5.6.1 ODF (Optical Distribution Frame)** | | | | |
| The ODF unit must have protection in front of the connector panel. |  |  |  |  |
| The empty intermediate pieces, where no connector is installed, must be supplied with dust protection both inside the ODF unit and on the panel. |  |  |  | Checks that the correct intermediate piece (colour) is used for the connector type in ODF. |
| Cable routes must be present and all connection cables must be located in cable holders. This requirement applies to the entire ODF, i.e. in panels within the same rack and between racks. |  |  |  |  |
| **2.5.9 Termination in property** | | | | |
| An incoming cable entering a home must be terminated in a standalone fibre outlet. |  |  |  |  |
| **2.5.9.1 Fibre outlets** | | | | |
| An outlet installed directly on a wall must be angled down, parallel with the wall, and must be protected against dust. |  |  |  |  |
| **2.5.11.1 Delivery measurement of fibre. Measurement methods and measuring instruments** | | | | |
| Attenuation measurement must be performed as OTDR measurement. |  |  | Prior to final inspection, check that delivery measurement has been performed. |  |
| During delivery measurement of passive fibre, 1310 nm and 1550 nm must be measured from one direction. |  |  |  |  |
| During delivery measurement of active fibre, 1625 nm must be measured from one direction. |  |  |  |  |
| On the measurement report, specify which measuring instrument, which measurement loop has been used and who has conducted the measurement. |  |  |  |  |
| The limit values in the table in the appendix Networks must not be exceeded. |  |  |  |  |
| **2.6 Labelling** | | | | |
| The labelling must be UV-resistant, must cope with lying in water for an extended period, must withstand chemicals and must be scratch-proof. |  |  |  |  |
| All parts of the fibre installation must be labelled with unique designations and all labelling must be ageing and weather-resistant. This must be taken into consideration in particular when labelling outdoors. |  |  |  |  |
| Labelling must correspond with the documentation’s designation. |  |  |  |  |
| Labelling must not be conducted using plain text for security reasons, e.g. “Arboga-Köping” or the customer’s name. |  |  |  |  |
| **2.6.1 Labelling of ducts** | | | | |
| Ducts must be labelled at both inputs and outputs in manholes and cabinets, at transitions from e.g. mast to cable ladder, as well as on either side of wall bushings. |  |  |  |  |
| **2.6.2 Labelling cables** | | | | |
| Fibre optic cables must be labelled at both inputs and outputs in manholes and cabinets, at transitions from e.g. mast to cable ladder, as well as on either side of wall bushings. |  |  |  |  |
| Labels must not accompany e.g. covers or front panels when these are removed. |  |  |  |  |
| **2.6.3 Numbering and labelling of racks and panels** | | | | |
| Each rack must be labelled with a unique designation. |  |  |  |  |
| Each individual ODF unit must be labelled. |  |  |  |  |
| The outlets’ numbering must be labelled on the panel. |  |  |  |  |
| **2.6.4 Labelling. Splice units** | | | | |
| On a splice cassette it must be clear which fibers / cables are in the cassette. |  |  |  |  |
| Splice cassettes must be labelled with “Warning: laser”. |  |  |  |  |
| **2.6.5 Labelling. Fibre outlets** | | | | |
| Fibre outlets in households must be labelled with the “Warning: laser” symbol. |  |  |  |  |
| **2.7 Safety** | | | | |
| Distribution points must be locked with an approved key, card or in a similar manner. |  |  |  |  |

(Example of) Extended inspection according to the client’s instructions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Approved** | **Not approved** | **Remarks** | **Comment** |
| **Additional inspection points** | | | |  |
| Visible damage to outdoor splice cabinet |  |  |  |  |
| Length of cable loop at least 25 m |  |  |  |  |
| Correct lock installed in distribution point |  |  |  |  |
|  |  |  |  |  |

Minutes taken by: ……………………………………

# 2. Checklist for final inspection, appendix Sites and Nodes

**Site/Node: …………………….**

Client: …………………….

Contractor: …………………….

Present: …………………….……………………. (representative for the client)

………………….……………………. (representative for the contractor)

………………….……………………. (inspector)

Minimum requirements in respect of execution, labelling and documentation according to

*“Instructions for Robust Fiber”*, Appendix Robust sites and nodes:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | **Approved** | **Not approved** | **Remarks** | **Comment** |
| **2.1 Classification of sites and nodes** | | | | | |
| Check that classification and risk analysis are performed in accordance with PTS’s operational reliability regulations. | |  |  |  |  |
| **2.2.1 Location** | | | | | |
| Outdoor cabinets must be positioned in locations that are well protected from snow clearance operations. | |  |  |  |  |
| Sites must never be located close to watercourses or in dips where there is a risk of flooding. | |  |  |  |  |
| **2.2.2 Building consents and permits** | | | | | |
| Check building consents and land agreements. | |  |  |  |  |
| **2.2.3.1 Climate cabinet** | | | | | |
| Climate cabinets must have at least IP class 54. | |  |  |  |  |
| **2.2.3.3 Type of site or node. Utilise part of an existing building** | | | | | |
| Ensure that access to the space is guaranteed 24 hours a day. Ideally with a separate door from the outside. | |  |  |  |  |
| **2.2.4 Design of sites and nodes** | | | | | |
| A site must be equipped with a climate system. | |  |  |  |  |
| A site must have a non-return valve in the floor drain (where present). | |  |  |  |  |
| The site must have automatic shut-off of water pipes present in the space. | |  |  |  |  |
| A node must be planned to ensure that mutual location of heat-generating equipment does not heat up other equipment, but rather that the heat is removed. | |  |  |  |  |
| **2.2.5 Electrical installation** | | | | | |
| The electrical installation must be documented and checked. | |  |  |  |  |
| **2.2.5.1 Electrical system** | |  |  |  |  |
| Distribution boards in the site must be adapted for 230/400V as a TN-S system and supplied with residual current devices. | |  |  | During final inspection, check that residual current devices are present. |  |
| Distribution boards must be grouped and fused for each group. | |  |  |  |  |
| Service outlets must be supplied with RCBOs. | |  |  |  |  |
| **2.2.5.2 Auxiliary power system** | | | | | |
| Where there is a UPS with batteries, the site must have an externally accessible intake for connecting the auxiliary power unit (emergency power generator). | |  |  |  |  |
| **2.2.6.1 Lightning protection** | | | | | |
| The site must be properly earthed. | |  |  |  |  |
| The site must be equipped with over-voltage protection and RCDs. | |  |  |  |  |
| **2.2.6.2 Equipotential bonding** | | | | | |
| All conducting parts are connected directly to the main equipotential bonding. | |  |  |  |  |
| The main equipotential bonding is connected to earth. | |  |  |  |  |
| All incoming conducting parts must be connected to the main equipotential bonding. | |  |  |  |  |
| **2.2.6.3 EMC** | | | | | |
| Is installed equipment CE marked? | |  |  |  |  |
| **2.2.7 Environment and climate regulation** | | | | | |
| A climate system must be present so that temperature and humidity are kept within the limit values that apply to the equipment placed in the node. | |  |  |  |  |
| A cooling system must be located so that leaks of liquid or condensation cannot reach the installed equipment. | |  |  |  |  |
| Drainage from the cooling system must be led out of the area. | |  |  |  |  |
| **2.2.8 Dust, dirt and moisture** | | | | | |
| Filters must be installed in all valves and supply air routes. | |  |  | Filters that are at least EU3 classified are recommended. |  |
| A site or node in a building must be fitted with raised thresholds where there is a risk of flooding. | |  |  |  |  |
| **2.2.9.1 Burglar protection** | | | | | |
| Doors to an area with direct access from outside must be made of steel. | |  |  |  |  |
| Doors in the existing building must be secured with e.g. a bolt, trailing edge strengthening device or equivalent protection. | |  |  |  |  |
| Keys must not be stored in the area. | |  |  |  |  |
| **2.2.9.2 Sabotage protection** | | | | | |
| Accessible cables must be protected against sabotage. |  | |  | Check that protective arrangements are present where applicable. |  |
| For sites that do not have a cast foundation, the protection between the ground and the underside of the floor must be designed so that it covers at least three sides around incoming cables. The protection must be buried at a depth of at least 25 cm and must be anchored in the floor. It may be executed as a robust protective pipe, a steel plate (at least 1.5 mm) that covers at least three sides of the ducts, or other equivalent protection. |  | |  |  |  |
| If possible, towing and lifting eyelets must be removed from technical shelters or climate cabinets. |  | |  |  |  |
| Shelters or containers must be securely anchored to the ground, e.g. through properly buried plinths or concrete beams. |  | |  |  |  |
| **2.2.10.1 Burglar alarm (if present)** | | | | | |
| Alarms must be transmitted to the operations centre and/or a surveillance company. |  | |  |  |  |
| **2.2.10.2 Operation alarm** | | | | | |
| There must be a function for receiving operation alarms. |  | |  | Check that the function is available by creating a test alarm. |  |
| **2.2.11 Biological damage** | | | | | |
| Where fibre optic cables or ducts are exposed to pests, such as rodent attacks, they must be protected with rodent protection, e.g. by means of additional metal reinforcement or ducts and fibre optic cables treated with repellent. Duct must be sealed so that pests cannot enter via the ducts. |  | |  |  |  |
| **2.2.12 Fire protection** | | | | | |
| The site’s fire protection must conform to EI30. |  | |  |  |  |
| Cell plastic should not be used as insulation in a Site |  | |  |  |  |
| **2.2.12.1 Fire extinguishing equipment** | | | | | |
| When there are premises or a building for an emergency power generator, this area must be supplied with powder extinguishers. |  | |  |  |  |
| **2.2.13 Maintenance plan** | | | | | |
| Sites and nodes must have a maintenance plan. |  | |  |  |  |
| In addition to that specified in the Operational reliability regulations, the maintenance plan must include regular inspection of filters, climate systems, electrical systems, locks and access control systems according to the manufacturer’s instructions and, if necessary, clearance of snow, brushwood and grass. |  | |  | During final inspection, check that a maintenance plan has been drawn up that complies with the minimum requirements. |  |
| **2.2.14 Other** | | | | | |
| There should not be any signs specifying the site’s owner etc. |  | |  |  |  |

(Example of) Extended inspection according to the client’s instructions:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Approved** | **Not approved** | **Remarks** | **Comment** |
| **Additional inspection points** | | | | |
| Damage at the site (external) |  |  |  |  |
| Electrical installation (wall sockets) |  |  |  |  |
| Internal lighting |  |  |  |  |
| Check dimensioning and operating time of auxiliary power system |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Minutes taken by: ……………………………………

# 3. Checklist for final inspection, appendix Documentation

**Documentation ……………….**

Client: …………………….

Contractor: …………………….

Present: …………………….……………………. (representative for the client)

………………….……………………. (representative for the contractor)

………………….……………………. (inspector)

Minimum requirements in respect of execution, labelling and documentation in accordance with “*Instructions for Robust Fiber*”, appendix Robust sites and nodes:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Approved** | **Not approved** | **Remarks** | **Comment** |
| **2.1 General requirements** |  |  |  |  |
| The documentation must be prepared in an editable digital format. Various formats are permitted, such as Excel, Word, etc.  Files of the type .pdf must not be used as originals as they are not editable. |  |  |  |  |
| The network’s constituent parts must have uniform names. |  |  |  |  |
| The structure and the designations must make it possible for the documentation to be supplemented in the event of any future changes to the network. |  |  |  |  |
| Individual constituents in a fibre installation must be documented. |  |  |  |  |
| Consequences in the event of any damage must be able to be surveyed and assessed quickly. |  |  |  |  |
| **2.3 Requirements regarding documentation that must be included** |  |  |  |  |
| **2.3.1 Network overview** | | | | |
| A network overview must be drawn up. |  |  |  |  |
| **2.3.2 Ducting** |  |  |  |  |
| **2.3.2.1 Ducting drawing** |  |  |  |  |
| Ducting drawing is a schematic drawing that shows nodes, wells and connection cabinets, as well as the ducts that connect them. Sub-ducts must also be shown on the drawing. |  |  |  |  |
| In those cases where ducting contains several ducts in the same trench, the identity of each duct must be clear by means of the duct´s colour code and/or labelling at either end. Colour codes or labelling of sub-ducts and microducts must also be presented. |  |  |  |  |
| **2.3.2.2 Location map** |  |  |  |  |
| The location map shows the geographic extent of the ducts on a digital base map. The location map is used e.g. during excavation work where cables in the work area need to be identified and indicated. |  |  |  |  |
| A survey file containing coordinates and a list of items constitute the basis for the location map.  The coordinate system that is used must be specified |  |  |  |  |
| **2.3.2.3 Survey file** |  |  |  |  |
| List of measured coordinates that has been created during geodetic position measurement of the ducting. |  |  |  |  |
| **2.3.2.4 List of items** |  |  |  |  |
| List of surveyed items. |  |  |  |  |
| If search string has been used, the documentation must also contain information showing the points at which the search string is accessible. |  |  |  |  |
| **2.2.3.5 Ducting drawing, private building land** |  |  |  |  |
| Ducting drawing must be produced, with agreed position for cable routing on private building land. |  |  |  |  |
| **2.3.3 Fibre optic cables** |  |  |  |  |
| **2.3.3.1 Cable drawing** |  |  |  |  |
| There must be a schematic drawing that provides an overview of the fibre optic cables and how they are connected via distribution points and terminations. |  |  |  |  |
| **2.3.3.2 Cable specification** |  |  |  |  |
| There must be a specification of the individual fibre optic cable, with information about e.g. the cable’s designation, the manufacturer’s designation, the number of fibres and the length of the fibre optic cable. |  |  |  |  |
| **2.3.3.3 Splicing plan** |  |  |  |  |
| There must be a detailed drawing or a connection table that shows fibre optic cables’ splices and terminations.  It must be clear from the splicing plan how individual fibres are spliced in the splicing unit and terminated in ODF. |  |  |  |  |
| **2.3.3.4 Panel card** |  |  |  |  |
| There must be a list of terminations in an ODF.  The panel card must contain information about the position of fibres in ODF rack and ODF panel, as well as information about where the other end of the fibre optic cable is terminated. It must also contain information about where a connection cable in a particular position is connected, as well as information about the connection. |  |  |  |  |
| **2.3.3.5 Measurement report** |  |  |  |  |
| Measurement reports from delivery measurements in the form of OTDR measurements must be included in the documentation. The measurement report is ideally attached to the cable specification. |  |  |  |  |
| Used measuring instruments must be specified in the measurement report. Software for reading the measurement results must be included in the documentation. |  |  |  |  |
| **2.3.4 Sites and nodes** |  |  |  |  |
| **2.3.4.1 Rack layout drawing** |  |  |  |  |
| There must be a rack layout drawing. |  |  |  |  |
| **2.3.4.1 Access information** |  |  |  |  |
| Access information must be present.  The access information is a document that shows the route to a site or node (route description), where keys (pass cards, codes, gate locks) are located and which keys are required, as well as who is the responsible contact person for the site or node. |  |  |  |  |
| **2.3.5 Land agreements** |  |  |  |  |
| Required land agreements must be dawn up and stored together with the documentation. |  |  | Land lease agreement,  Utility easement,  Usufruct agreement,  Easement |  |
| **2.4 Document that should be included** |  |  |  |  |
| **2.4.1 Distribution point drawing** |  |  |  |  |
| When several ducts terminate in or pass a well or a switch cabinet, the documentation should be supplemented with a distribution point drawing. This should give a schematic presentation of the distribution point with ducts. |  |  |  |  |
| **2.4.2 Distribution point card** |  |  |  |  |
| A specification showing information about the distribution point. Distribution point cards should be produced and can contain all the information or refer to other documents. |  |  |  |  |
| **2.4.3 Site drawing** |  |  |  |  |
| A schematic drawing that presents the internal space in a site. The drawing must present designations and the nodes, racks and other units found in the site, as well as where they are located. |  |  |  |  |
| **2.4.4 Cross-section drawing for trench** |  |  |  |  |
| A schematic drawing that shows a cross-section of buried ducts and their designation, including sub-ducts.  The drawing must set out relevant ducts, their designations and mutual location in the trench. The direction of the cross-section must also be specified. |  |  |  |  |
| **2.5 Management of documentation** |  |  |  |  |
| There must be an appointed function that continually updates the documentation in the event of changes in the fibre installation |  |  |  |  |
| 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 least two different physical locations. |  |  |  |  |
| The documentation must be stored in such a way that it is accessible in the event of actual or anticipated fault situations, so that faults can be rectified quickly. |  |  |  |  |
|  |  |  |  |  |

Minutes taken by: …………………………………