Instructions for Robust Fiber

Appendix 1 Terms and definitions

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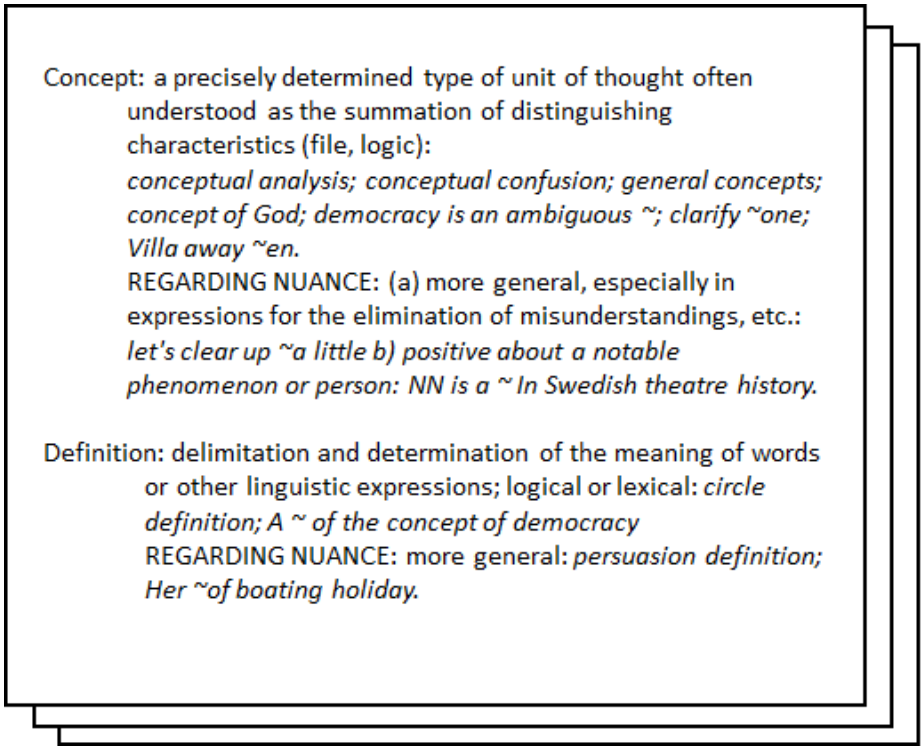

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1. INTRODUCTION

The document "*Instructions for Robust Fiber*" comprises one main document and a number of appendices. This appendix, Terms and definitions, details the terms that are relevant for a fibre installation.

The players in the sector use various expressions and terms to describe a fibre installation and its constituent components. It is necessary to gather the terms that are used in order to obtain sector-wide definitions. In the event of external contacts, it is therefore an advantage to use the common terms and definitions that are listed here.

Terms and definitions are sorted under the following areas sorted in alphabetical order within each area.

:

- General
- Network structure
- Ducting
- Fibre optic cable
- Sites and nodes
- Documentation
- Inspection
- Measurement methods
- Routing me

2. TERMS AND DEFINITIONS

2.1 General

Alliance network	Network that is established within a fibre alliance.
Fibre installation	The complete installation with all its constituent components, including e.g. sites, nodes, ducts and fibre optic cable.
Network owner	The organisation that owns and manages the fibre installation. Often the client in a fibre installation project.

2.2 Network structure

In order to describe network structure, four network levels are used. The highest level comprises national networks (level 1) and the lowest level (level 4) comprises access networks for connecting end customers. Levels 1–3 have the combined name Transport networks and are made up of networks between nodes.

National networks (level 1)	National networks link together the country's various regions and are also connected to international networks. National networks are also known as wide area networks, core networks and backbone networks.
Regional networks (level 2)	Regional networks link together networks within a region.
Connection networks (level 3)	Connection networks link together regional networks with access networks. Can include networks within an urban area, for example.
Access networks (level 4)	Networks between access nodes and end customers in order to connect individual end customers or customer groups. Connections within access networks are also known as local access. An alliance network is an example of an access network, intended to connect individual end customers outside of built-up areas. Area networks constitute a proportion of access networks. An example of an area network is a network between buildings in a shared legal property, for example within a community or in a shopping centre. Property networks are linked to access networks and are distribution networks within a building or property.

2.3 Ducting

Annular rigidity type	Ducts resistance to pressure is defined by their annular rigidity, i.e., the pressure that the product can withstand during a test before it deforms.
Backfill height	Relates to refilling from the upper part of the duct to the finished ground level(surface).
Cabinet	Distribution point located above ground, either outdoors or in a property, where ducts and fibre optic cables start or terminate or are connected to other ducts and fibre optic cables. Can also be designated a switch cabinet or an outdoor splice cabinet.
Cable indication query	Indication of the location of cables in the ground. Can be achieved by sending a detailed map of the location of cables or by using colour marking locally in the ground to indicate where cables are routed. Also known as cable staking or simply staking.
Cable fixation point	Device for connecting search string in order to facilitate cable indication/cable staking. Also known by the Swedish abbreviation KUP.
Demarcation point	The point where ducting is transferred, e.g. at a plot boundary.
Distribution point Also applies to	Point at which ducts starts, terminates or branches. Could be a Optical fibre chamber, cabinet, splicing box or node, for example. fibre optic cables. Also known as a connection point.
Ducting	Ducting is an arrangement that provides space and protection for cables. The term Ducting includes all components that jointly make up an arrangement for the protection of cables, e.g. ducts, standard ducts, microducts, cable ducts, optical fibre chambers, search wire. Ducts are also known as ducts.
Ducting section	Refers to the combined ducting between two points.
End plug	Used to seal ducts that have not yet been taken into use. Also known as end seals, sealing plugs or duct plugs.
Facade box	Box located on the facade of a building and used for splicing fibre cable for the building.
Farmland	Relates to land that is cultivated.
Frost thawing	Method for thawing ground in the event of frost. Can be performed by firing with coal or by electrically heating up the ground.

Greenfield sites	Refers to ground where there are no obstacles in the form of other cable routing, asphalted surfaces, crossings with other cables, etc.
Warning mesh	A tape in a clear colour that is placed in the refill material above buried ducts. Also known as warning net. Search wire may be incorporated directly in the marking tape.
Microducts	Is a duct with an inner diameter of approx. 3–18 mm. This type of duct is intended to be used either indoors or within other ducts (thin-walled) or directly in the ground (thick-walled).
Standard duct	Sandard duct, are ducts specially manufactured for routing fibre optic cables. Standard inside diameters range from about 12-15 mm to 50 mm.
Splice connection	Sealed connection that is used to splice ducts.
Sub-ducting	Arrangement for ducting that is surrounded by other ducting, e.g. several ducts that are surrounded by a larger duct.
Search wire	A wire made of acid-resistant, stainless steel that is routed above or below ducts. Used to facilitate the locating of ducting with the aid of a tone transmitter and cable locator. The search string may be separate or incorporated in marking tape.
TA plan	Traffic arrangement plans must include details about roadworks and how such works are to be signalled.
Wall box	Box located on a wall and used for splicing fibre cable.
Optical fibre 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.
Wire span	Method where wire is stretched between two points. Ducts or cables are then suspended on the wire.

2.4 Fibre optic cable

Aramid thread	Durable thread made of aramid yarn that can be used for strain relief in fibre optic cables.

Broadband space	A space, normally a cabinet, in a house or apartment where fibres are terminated. A home network (connections to other rooms) can also be connected in this space, which is also known as a broadband cabinet, IT cabinet, media cabinet or media centre.
Connection	A connection connects two or more nodes via one or more fibre links/transfer units.
Connection cable	Fibre optic cable with connectors at both ends. Used to connect between outlets in ODFs or active equipment. Also known as fibre patch, patch cable or connecting cable.
Connection point	Physical point where a network is terminated at the end customer.
Connection site	Refers to a space, room or similar where cables start, branch or terminate, such as a optical fibre chamber, outdoor splice cabinet node or splicing box. See distribution point.
Cross-connection	Connection with a connection cable between two fibre outlets, e.g. in an ODF.
Fan-out	See pigtail. A fan-out is a collection of fibres, a fibre ribbon with connectors at one end that is welded to a fibre ribbon in an fibre optic cable. Also known as a ribbon tail.
Fibre	Part of a fibre optic cable. Optical fibre is a thin fibre of glass or plastic that transfers information using light instead of with electrical signals, which is the case in a copper cable. • Single fibre: A connected or non-connected fibre in a fibre optic cable. Fibre pair: Two connected or non-connected fibres in a fibre optic cable make up a fibre pair. • Black fibre: Unlit fibre connection.
Fibre blowing	Method for inserting fibre optic cable into a duct with the aid of compressed air.
Fibre connector	Optical connector that is used to terminate a fibre. Available in several different versions for different purposes.
Fibre link	Fibre that has been spliced and terminated so that communication is possible between its end points. A fibre link is also known as a transfer unit.
Floating	Method for inserting fibre optic cable into ducts with the aid of water. Suitable for long distances.
Intermediate piece	Device for connecting two fibre connectors to each other. Intermediate pieces are available in different versions for different purposes.
Loop	In distribution points, fibre optic cables can be laid in a loop (the cable is laid in a circle in several rotations). This is a way of facilitating the

	repair of the cable as well as the splicing in of another fibre optic cable between two distribution points.
Main cable	Fibre optic cable between distribution points or between a node and a distribution point, which then branches to smaller cables for the connection of customers.
ODF	Optical Distribution Frame, equipment for terminating, connecting and cross-connecting fibres. An ODF unit is part of an ODF (also known as an ODF module or ODF panel). An incoming fibre to a node is terminated with a connector on the inside of the ODF unit, and the fibre's capacity can be accessed on the front of the ODF unit.
ODF panel	The front of an ODF unit. Also known as an ODF module or simply a panel.
Optical cable	Individual fibre optic cable or straight-spliced fibre optic cable of the same type.
Pigtail	A single, short optical fibre that has an optical connector pre-installed at one end. Used to weld a connector to an optical fibre. Also known as a pig-tail or pig tail.
Rodent protection	Protection against vermin. Might be e.g., a sheet metal rail, reinforced duct, armoured cable or additives in the cable's/duct's sheath material.
Splice	Permanent connection of fibres (as opposed to when e.g. connectors are used). A splice is normally welded. Also known as a fibre splice or optical splice.
Splicing off	Type of splice where some of the fibre optic cable's fibres are spliced together with fibres in a second fibre optic cable, other fibres in the fibre optic cable are spliced together with the fibres in a third or more fibre optic cables. Also known as branching.
Straight splice	Type of splice where all the fibres in two cables are spliced together.
Termination	Means that a cable is terminated, and its capacity is made available for connection in a connector.
Transition joint	Also known as a station joint. Designates a joint between different cable types, e.g. an outdoor cable, indoor cable or underwater cable.
Transfer point	Physical point for fibre termination where connection takes place at fibre level between operator, network owner or customer. Transfer point is also known as entry point.

2.5 Sites and nodes

Access node	The node that is connected on one side to a connection network and on the other side to an access network. Access nodes are also known as distribution nodes or area nodes.

Auxiliary power system	A device for supplying sites and nodes with electrical power in the event of an interruption in the incoming electrical power supply. Could e.g., be a generator that is powered by a motor (permanently installed or portable), a fuel cell or a UPS with batteries.
Electrical system	System for distributing electrical connections in a site or node. TN-S entails a 5-conductor system with separate protective earth and neutral conductor. TN-C entails a 4-conductor system with a combined earth and neutral conductor.
EMC	Electromagnetic compatibility. The ability of apparatus, equipment or systems to work in their electromagnetic environment without causing unacceptable interference in this environment.
End customer	End customer refers to the party that will utilise the finished product or the service. From the network owner's perspective, this could be the customer's customer.
Meet Me Room	Separate area in a site where cross-connection between external network owners/operators can take place.
Node	A node is a distribution point where traffic flows are forwarded, concentrated and/or distributed. Can be a distribution point for fibres or distribution point where fibres are connected to other types of network. ODF and active communication equipment is placed in a node, for example.
Outdoor cabinet	Also known as an environmental cabinet. Cabinet adapted to work as a small site and node. Can contain an auxiliary power system, climate system, ODF and active equipment. SiteA physical area that contains one or more nodes. Sites have e.g., the following functions: shell protection, electrical systems, auxiliary power systems and climate systems.
UPS	Uninterruptible Power Supply. Can also even out and stabilise the voltage. Can be fitted with batteries for operating times of various lengths.
User node	The node that is found at the end user. This may be a simple fibre outlet or with active equipment. Can also be referred to as a property node.

2.6 Documentation

Accuracy class	Specifies the accuracy with which a point is measured. For example, accuracy class 2 specifies that the point must be measured with an accuracy of 25 cm or less accuracy.

Delivery measurements	Measurement of the fibre network's optical properties such as attenuation and reflection.
Duct drawing	Schematic drawing of the connection of ducts.
Easement	Concept relating to the right that a property has to utilise another property in a certain way.
GIS	Geographic Information System. A computerised system for gathering, storing, analysing and presenting geographic data on a digital base map. GIS is often used to describe a network's extent and information about the geographic location, designations, etc., of the various parts of the network.
Land agreement	Generic term for the various forms of agreement that exist to regulate rights and permits to route fibre installations.
Land lease agreement	Temporary agreement where the land owner grants e.g. the cable owner the right to use the land for laying cables.
Ledningskollen	National service for cable indication queries, design and planning queries, coordination queries and community planning queries. www.ledningskollen.se
Location map	Duct drawing where the ducting's surveyed geographic position is presented on a map with a high degree of accuracy.
Panel card	Document that shows fibre optic cable's termination points, their connectors and what they are connected to.
Placement	Placing of equipment in another party's premises. This could be e.g. in a site, a technical area or in a mast.
Prioritisation list	List of connections which clearly sets out which connections have the highest priority. Used in the event of major cable faults to prioritise the order in which connections should be restored.
Rack layout drawing	Drawing showing the units found in a rack and where in the rack they are located.
Splicing plan	The splicing plan is a detailed drawing or a connection table that shows fibre optic cables' splices and terminations, with information for identification.
Utility easements	The Utility Easements Act is a Swedish act that regulates the right for legal entities to route cables through the property of other parties. Utility easement is the strongest form of agreement for cables.
Usufruct agreement	The right to use something that is owned by another party, such as ducts.

2.7 Inspection

Construction meeting and the following-up of must	Regular meeting held during the project period for decision-making finances, timing, technology and quality. At the meeting, minutes be kept by the client and be checked by the contractor.
Contractor	Denotes a person or company that carries out work on a contract, e.g., an excavation company.
Controller	Representative appointed by the client who continually checks the installation work throughout the implementation period.
Inspector	Impartial person with experience in the area. Engaged by the client or jointly with the contractor to conduct an inspection of the fibre installation.

2.8 Measurement methods

Attenuation measurement	Method for measurement of output loss (attenuation) in fibre. By connecting a light source with known, stable output on one side of the fibre and a power meter on the other side, it is possible to calculate out much light is lost.
OTDR	OTDR (Optical Time Domain Reflectometer). Instrument for characterising an optical fibre.
OTDR measurement	Method for measuring attenuation and reflections in fibre, fibre joints and connectors.

2.9 Underground routing methods

Chain excavation	Also known as milling excavation. The ground is dug up with scoops (blades) that are mounted on a chain.
Directional drilling	This method can be used for various types of material, such as soft soil

	types, mixed material and rock.
	A pilot rod is drilled forwards in the ground along a predetermined line. The position of the drill head is checked with a built-in radio transmitter and guided with an angled steering head. When the pilot rod is pulled back out again, the drill hole is widened with a hole opener. At the same time, the media duct is pulled into the drilled hole.
Excavation	An excavator with a bucket that digs a trench. This can also be performed manually with a spade.
End milling	Also known as infratrenching or minitrenching. The ground is milled with a milling wheel with carbide bits. The groove is 30–150 mm wide and up to approx. 450 mm deep.
Hammer drilling	Also known as casing drilling. A compressed air-driven hammer pulls along a casing. Used primarily in rock.
Impact mole	A "rocket-shaped" rod that is driven forwards through the ground with the aid of a compressed air-driven piston. Duct can be routed directly behind the impact mole or be routed by reversing the mole. Only for short distances, approx. 10–20 metres.
Microtrenching	Also known as micro-ditching or groove cutting. The ground is cut with a saw blade, the outer edge of which includes segments containing diamonds. The groove is 15–30 mm wide and up to approx. 400 mm deep.
Ploughing	A plough with a blade that is driven down into the ground with the aid of a machine. The machine pulls the blade, either static or vibrating, through the ground. A duct runs through a laying tube behind the blade and is routed directly behind the plough.
Pressing	Pressing Can also be referred to as auger boring. A steel duct (casing duct) is pressed from one point to another. The duct remains in the ground and becomes the outermost ducting, into which ducts are then inserted. This method is only used for short distances.
Suction excavation	Powerful suction that draws material up out of the ground.