



CESAR²

Sub appendix
Service specification
Dark fibre standard

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1. Product Dark fiber standard

1.1 TECHNICAL SPECIFICATION (Attributes)

Product type Dark fiber standard include the following products:

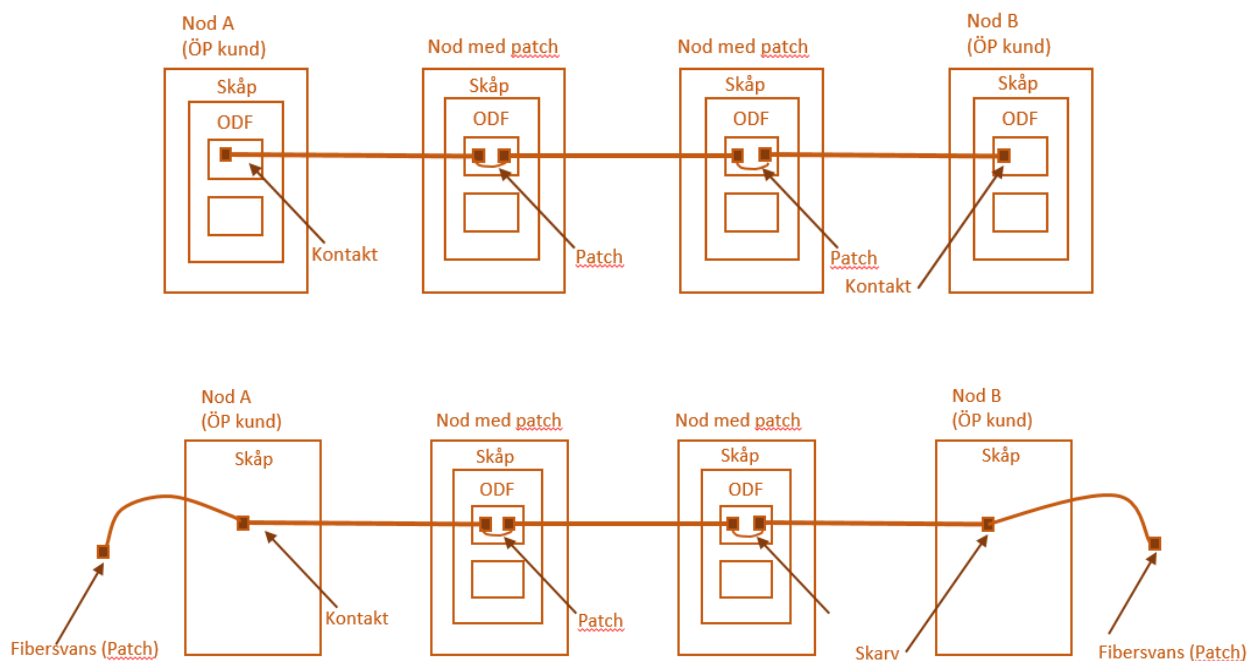
Product category: Access (Passive)				
Product type: DARK FIBER STANDARD				
ATTRIBUTES	PRODUCTS			
	Dark fiber standard Mono	Dark fiber standard Pair	Dark fiber standard Mono redundant	Dark fiber standard Pair redundant
Interface Single mode fiber, 10/125µm. Connection interface consist of LC/SC-connections in ODF or in termination box or fibertail (patch).	X	X	X	X
Type Optical fiber according to the standard ITU-T Rec. G.652B or later (G.652C or D) or ITU-T G.657 Category A	X	X	X	X
Attenuation Mean value in fiber cable for each wavelength range, including splice attenuation and excluding contact attenuation. 1285–1330 nm: ≤ 0.40 dB / km 1530–1570 nm: ≤ 0.28 dB / km 1570–1625 nm: ≤ 0.40 dB / km	X	X	X	X
Reflection Maximum reflection at any point - 50 dB. Reflection measurement is measured in OTDR measurement which can be ordered extra.	X	X	X	X
Weld / splice The average attenuation of the splice shall be 0.1 dB, and the attenuation of individual splice shall not exceed 0.2 dB.	X	X	X	X
Connector Connector SC, according to ITU-T, of type SS-EN 61754-4 Connector LC, according to ITU-T, of type SS-EN 61754-20 Connector FC, according to ITU-T, of type SS-EN 61754-13 with reflection attenuation better than 40 dB. Contact attenuation shall be at most 0.3 dB.	X	X	X	X

Polarization mode dispersion (PMD) PMD is measured in a transmission direction at 1550 nm and should be max 0.5 ps / vkm. PMD is measured at regional accesses (distance > 250km).	X	X	X	X
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1.1.1 Specifikation access

An (1) access consists of one (1) fiber pair (two fibers) or one (1) fiber. An access has one A-end and a B-end in two different Nodes which are available to Buyers for connection to customer-owned equipment or fiber. Along the connection, there may be nodes where patching takes place. In these nodes, Buyers do not have access. Delivery point of Connection (ÖP) takes place in ODF or in fiber tail (patch).

Picture: Connection with patches and terminations



1.1.2 Ledningskollen and quality system

The network in which the seller intends to lease or leases Access to the Buyer shall, unless otherwise stated, be reported to Ledningskollen.

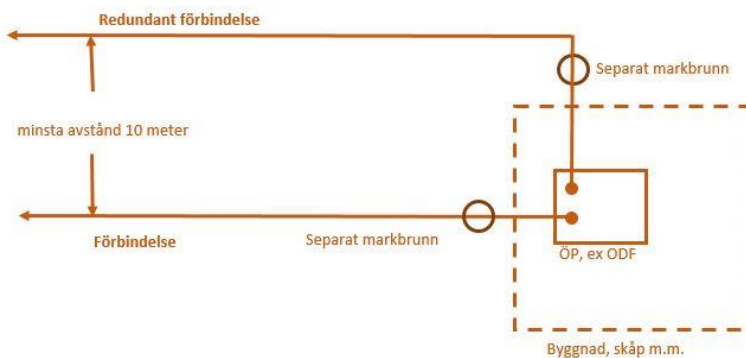
1.2 REDUNDANT ACCESS

Definition of Redundant Access

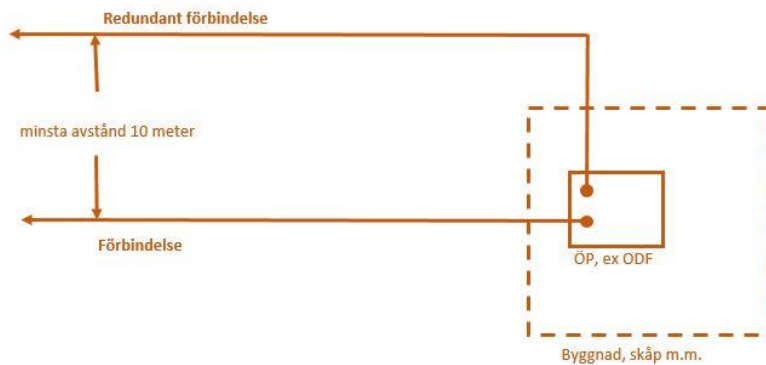
A Redundant Access shall by definition grant the following demands, see picture below.

- Physically separated routes between connection points (A-and B-ends)
- Previous point implies that the Redundant Accesses are physically separated up to delivery connection point in both A- and B-ends.
- Minimum distance between Primary Access and Redundant Access must be at least 10 meters, except the last part up to delivery connection point. In case of lack of space inside a building, the Primary Access and Redundant Access shall be laid in a separate room or corridor.
- Primary Access and Redundant Access get to criss cross, but such crossing shall be made through a 90 degree angle, and +/- 1 meter from the crossing shall a specific mechanical cover be arranged between the two accesses, if the distance is less than 2m. Special mechanical cover means some sort of digging security, e.g. a 10 mm thick plate of steel or similar. Separate ground hubs can be required extra when ordering, see picture Redundant Access.

Picture: Example: Redundant Access



Picture: Example: Redundant Access without ground hub



Deviations from the Redundant Access can be contracted with the Buyer. In this case the deviations from the definition above, shall be made clear.

1.3 Test/measurement protocol

1.3.1 Test of access and measurement protocol

Document the type of fiber used and verify the termination points of the fiber.
Document that attenuation measurement in all fiber links / feed units has been performed.
Attenuation measurement shall be performed with a calibrated instrument and measurement shall be performed in both directions, see SS-EN 61280-4.

1.3.2 Measurement

OTDR measurement with measurement protocol does not include delivery of Connection but can be ordered as an option.

1.4 BUYER'S COMMITMENTS

In cases where the Seller is to install equipment in the Buyer's premises (technology space, ground well, etc.), the Buyer is responsible for ensuring that space in ODF is available at no cost to the Seller.

1.5 Selectabel Characteristics (Variables)

The following options/variables of Dark fiber standard products shall be available for the Buyer to order.

Product category: Access (Passive)				
Selectabel Characteristics DARK FIBER STANDARD (Variables)				
	Dark fiber standard Mono	Dark fiber standard Pair	Dark fiber standard mono-redundant	Dark fiber standard Pair redundant
Access: Point to Point (P-P)	X	X	X*	X*
Quantity	X(mono)	X(pair)	X(mono)	X(pair)
* Dark fiber standard mono/pair must be ordered together or in advance for the redundant access with the primary access.				
Service level				
SN 0 - 99.5% Holiday free weekdays	X	X	X	X
SN 1 – 99.7%	X	X	X	X
SN 2 – 99.9%	X	X	X	X
Contact type				
SC/APC	X	X	X	X
SC/UPC	X	X	X	X
LC/APC	X	X	X	X
LC/UPC	X	X	X	X
FC/APC	X	X	X	X
FC/UPC	X	X	X	X
One-time fee / Contract period				
Connection fee (fixed fee for point connection)	X	X	X	X

Digging cost (digging etc. for point connection)	X	X	X	X
Contract period	X	X	X	X

1.6 Measurement period

Measurement period refers to a 12 months period and the period the Seller commits to perform Troubleshooting during service time according to agreed Service level for products specified in this service specification.

1.7 Access Safety

1.7.1 When connecting an access the contacts shall always be inspected and cleaned. The person handling the contacts shall be aware of the risks of dealing with laser.

Equipment with laser class 3 and 4 connected with the access shall have automatic switch-off and this function shall not be shut down.

To avoid injuries of person and premises, the affiliated equipment to the connection shall meet as follows:

-Recommendation **ITU-T G.664** *“Optical safety procedures and requirements for optical transmission systems”*

Technical Report **IEC TR 61292-4** *“Optical amplifiers –Part 4: Maximum permissible optical power for the damage-free and safe use of optical amplifiers, including Raman amplifiers”*

1.7.2. Disconnection of an access

On the day when the lease for a certain Access expires, the Buyer shall switch off the Access light signal to enable safe disconnection of the Connection. This must be notified to the Seller's NOC.