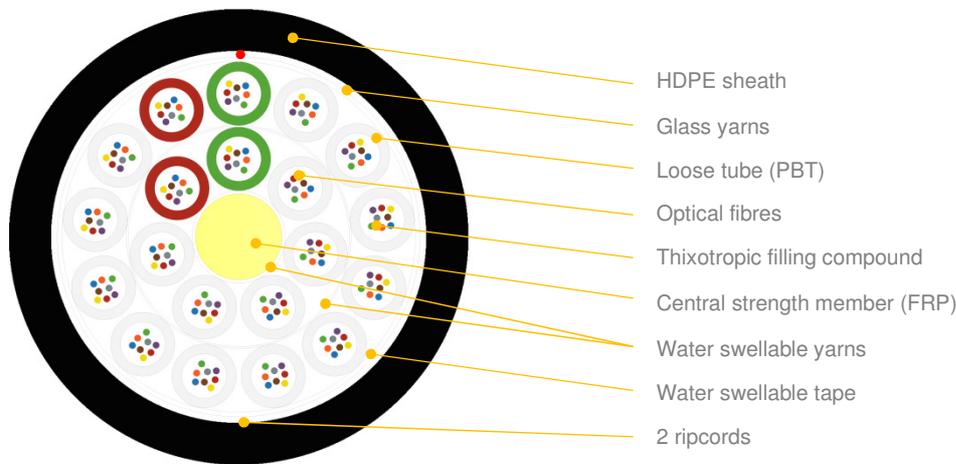


BDCVM 160F External Cable



*schematic drawing, not to scale

DESIGN:

FRP strength and anti-buckling element
 Dry yarns to prevent moisture ingress into the cable
 SZ stranded cable core
 Loose tubes (PBT Ø 2.0mm) with thixotropic filling compound and ITU-T G.652D optical fibres
 Yellow PE fillers (when applicable)
 Water-swellable tape
 Glass yarns as strain relief
 Red polyester ripcords (2)
 UV stabilized black HDPE sheath (nominal thickness 1,3mm / min 1,25mm)

| Variant | Quantity [pcs] | | | | Ø nominal (-0,4/+0,4) [mm] | Nominal weight (±10%) [kg/km] | Max allowed tension [N] / ε=0,4% | Max static tension [N] / ε=0,25% |
|---------|----------------|--------------------|-------------------|-----------------|----------------------------------|----------------------------------------|-------------------------------------------|-------------------------------------------|
| | Fibres | Fibres per tube | Total elements | Active tubes | | | | |
| | 20T x 8F | 160 | 8 | 20 | | | | |

FIBRES COLOUR CODE

| | | | | | | | | |
|--------------|------|--------|-------|-------|------|--------|-----|--------|
| Fibre number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Fibre colour | Blue | Orange | Green | Brown | Grey | Yellow | Red | Violet |

TUBES COLOUR CODE

First tube: Green **Other tubes:** Natural (containing G.652D)
Last tube: Red

OPTICAL FIBRES AND LOOSE TUBES COLOUR IDENTIFICATION

Fibres and tubes identification information see **DSH_Colors_CODE_XXXX** document.

FIBRES PARAMETERS

Optical fibres parameters see **DSH_OFP** document.

MECHANICAL AND ENVIRONMENTAL CHARACTERISTICS

Temperature range:

Installation: -5... +50 [°C]
 Operation: -10... +70 [°C]
 Transport & Storage: -40... +70 [°C]

Cable bending radius:

12 x cable diameter (during operation)
 20 x cable diameter (during installation)

| Test | Specification | Method | Requirements |
|---------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tensile strength | IEC60794-1-21 Method E1 | Mandrel diameter: $\geq 30 \times \text{OD}$ Sustained load: 1400N / 15 min Sample Length: 100 m 1 fibre per tube to be spliced on inner and outer layer. Inner and outer layers are being monitored separately and at the same time | Fibre strain: $< 0.25\%$ (during test) $\leq 0.05\%$ (after test) Attenuation increment: $\Delta\alpha \leq 0.05\text{dB @ } 1550\text{nm}$ (after test) No significant damage to fibre unit |
| | | Mandrel diameter: $\geq 30 \times \text{OD}$ Extended load: 2700N or $\epsilon=0.4\%$ / 15 min Sample Length: 100 m 1 fibre per tube to be spliced on inner and outer layer. Inner and outer layers are being monitored separately and at the same time | Fibre strain: $< 0.4\%$ (during test) $\leq 0.05\%$ (after test) Attenuation increment: $\Delta\alpha \leq 0.05\text{dB @ } 1550\text{nm}$ (after test) No significant damage to fibre unit |
| Crush resistance | IEC60794-1-21 Method E3 | Load: 1600 N / 10 cm / 5 minutes Plate size: 100 mm x 100mm Number of pts: 3 (500mm apart) <i>All fibres to be monitored</i> | $\Delta\alpha \leq 0.1\text{dB @ } 1550\text{nm}$ (after test) No jacket cracking and fibre breakage |
| Impact resistance | IEC60794-1-21 Method E4 | Impact energy: 10J Radius: 300 mm Distance: 0.5m No. of impacts: 3 at different points 500mm apart <i>All fibres to be monitored</i> | $\Delta\alpha \leq 0.1\text{dB @ } 1550\text{nm}$ (after test) No jacket cracking and fibre breakage |
| Torsion | IEC60794-1-21 Method E7 | Cable length to be twisted: 1m No. of cycles: 5 Twist angle: starting position to -180° to starting position to $+180^\circ$, and back ($\pm 360^\circ$ total) Load: 100N <i>All fibres to be monitored</i> | $\Delta\alpha \leq 0.1\text{dB @ } 1550\text{nm}$ (after test) No jacket cracking and fibre breakage |
| Bending | IEC60794-1-21 Method E11 | Mandrel radius: $12 \times \text{OD}$ / 5 turns (wrapped and unwrapped) / 3 flexing cycles <i>All fibres to be monitored</i> | $\Delta\alpha \leq 0.1\text{dB @ } 1550\text{nm}$ (after test) No jacket cracking and fibre breakage |
| Repeated bending | IEC60794-1-21 Method E6 | Sheave Radius: $10 \times \text{OD}$ No. of cycles: 300 Flexing speed: 15 cycles/minute Load: 100N <i>All fibres to be monitored</i> | $\Delta\alpha \leq 0.1\text{dB @ } 1550\text{nm}$ (after test) No jacket cracking and fibre breakage |
| Abrasion resistance | IEC60794-1-21 Method E2B (Method 1) | No. of cycles: 400 Load: 4N (PE sheath) | Legend shall remain legible |
| Water penetration | IEC 60794-1-22 Method F5A and F5B | Water head: 1m Sample length: 1m (3 samples of each cable) Time: 24 hrs | No water leakage |
| Tube kink | IEC 60794-1-21 Method G7 | Length(L1): 350mm Moving length: 100mm/60mm Number of cycles: 5 Number of samples: 5 | No tube kink |
| Ripcord test | IEC 60794-1-21 Method E25 | Keeping the test samples 12h @ -10°C 400mm of the cable sample should be ripped through and the cable core revealed. No. of samples: 3 | The rip cord shall rip through the cable sheath and not break for the entirety of the pull |
| Temperature cycling | IEC 60794-1-22 Method F1 | Temperature steps: 1 cycle $+23^\circ\text{C} \rightarrow -10^\circ\text{C}(T_{A1}) \rightarrow +60^\circ\text{C}(T_{B1}) \rightarrow +23^\circ\text{C}$ 2 cycle (last cycle) $+23^\circ\text{C} \rightarrow -10^\circ\text{C}(T_{A1}) \rightarrow -40^\circ\text{C}(T_{A2}) \rightarrow +60^\circ\text{C}(T_{B1}) \rightarrow +70^\circ\text{C}(T_{B2}) \rightarrow +23^\circ\text{C}$ Step time: 8h | For T_{A2} and $T_{B2} \leq 0,15\text{dB/km}$ For T_{A1} and $T_{B1} \leq 0,05\text{dB/km}$ Test wavelength: 1550nm |

| | | |
|----------|------------------|--------|
| Type: | BDCVM-0108-20-PE | REV: 0 |
| Issued: | 23/11/2021 | KP |
| Project: | 079-21 | |

MARKING

The following print is applied at 1-meter intervals:

“MANUFACTURER’S NAME” “NUMBER OF OPTICAL FIBRES” “FIBRE TYPE” “YEAR/MONTH” “CUSTOMER” “LASER SYMBOL” “LENGTH MARKING” “BATCH NUMBER”

Example: FIBRAIN BDCVM-0108 160F SM G652D 20T8F 2015/06 PROPERTY OF VIRGIN MEDIA “LASER SYMBOL” “LENGTH MARKING” “BATCH NUMBER”

The accuracy of marking is $\pm 0,5\%$. Remarking is in accordance with Bellcore GR 20 and supersedes earlier markings. Occasional loss of marking is possible. Cables can be supplied with a range of single mode or multimode fibres and customized print.

PACKING

Cables will be shipped on disposable wooden or treated wooden drums. Both ends of the cable will be capped and accessible for testing. Rotation direction arrow will be marked on the drum together with identification information.

DELIVERY LENGTH

2000 – 8000 meters +1% / -2%, with possibility of supplying up to 5% of total contract quantity as short length cables which should be above 1000 meters long. Tolerance of 5 % of order quantity shall be allowed.

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