



X G.652.D Construction

X Steel Wire Armoured

X OS2 Performance

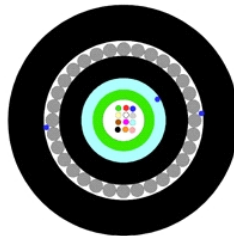
X 25 Year System Warranty

### Features

- G.652.D Construction
- OS2 Performance
- Internal External Grade
- LSOH Black Sheath
- Steel Wire Armoured
- 25 Year System Warranty
- Sequentially Metre Marked
- Cut to length service

### Product Overview

Excel's range of steel wire armoured cables are suitable for direct burial and the most demanding of installations. These cables are constructed from standard single loose tube cables which are then packed into a flexible but strong fibreglass waterblocking strength member. An internal sheath of black low smoke zero halogen (LSOH) material is then applied, a rip cord is inserted under the sheath to ease cable stripping and an oversheath of black LSOH is added.



### Performance Overview

Excel singlemode fibre optic cables are made of a high grade doped silica core surrounded by a silica cladding. They are coated with a dual layer, UV cured acrylate based coating. This enhanced Single mode fibre provides improved performance across the entire 1260 nm to 1625 nm wavelength spectrum due to its low attenuation in 1383 nm, the water-peak region.

#### Cores Colours

- |              |           |            |               |
|--------------|-----------|------------|---------------|
| 1. Red       | 2. Green  | 3. Blue    | 4. Yellow     |
| 5. White     | 6. Grey   | 7. Brown   | 8. Violet     |
| 9. Turquoise | 10. Black | 11. Orange | 12. Pink      |
| 13. Yellow   | 14. White | 15. Grey   | 16. Turquoise |

#### Identified by a RED binder

- |              |           |            |               |
|--------------|-----------|------------|---------------|
| 1. Red       | 2. Green  | 3. Blue    | 4. Yellow     |
| 5. White     | 6. Grey   | 7. Brown   | 8. Violet     |
| 9. Turquoise | 10. Black | 11. Orange | 12. Pink      |
| 13. Yellow   | 14. White | 15. Grey   | 16. Turquoise |

#### Identified by a BLUE binder

## Physical Properties

Property	Test method	Value
Permanent tensile strength	IEC 60794-1 E1	1000 N (no attenuation change, fibre strain less than ¼ of proof test level)
Short term tensile strength	IEC 60794-1 E1	2000 N (fibre strain less than ½ of proof test level)
Maximum installation tensile strength	IEC 60794-1 E1	3000 N (fibre strain less than ½ of proof test level)
Impact	IEC 60794-1 E4	15 Nm (no attenuation change, no broken cable elements)
Crush (compressive strength)	IEC 60794-1 E3	1500 N
Torsion	IEC 60794-1 E7	5 cycles ± 1 turn
Kink	IEC 60794-1 E10	The cables do not form a kink when a loop is drawn together to a diameter of 100 mm
Temperature range	IEC 60794-1 F1	Operation -30°C to +60°C Installation -30°C to +40°C Storage -40°C to +60°C
Water penetration	IEC 60794-1 F5B	No water on free end

Property	4-16 Cores	24 Core
Nominal diameter	10.0 mm	10.5 mm
Nominal cable weight	165 kg/km	180 kg/km
Minimum bend radius		
	Unloaded (IEC 60794-1 E11)	160 mm
	Loaded	160 mm

Property		
Strength member	Waterblocked E-Glass rovings	
Inner Sheath	1.0 mm black, Halogen free, flame resistant thermoplastic sheathing compound acc. to EN 50290-2-27, UV stabilised	
Outer Sheath	1.4 mm black, Halogen free, flame resistant thermoplastic sheathing compound acc. to EN 50290-2-27, UV stabilised	
Armouring	Ø 1.0 mm soft zinc coated steel wires	
Fire rating	IEC 60332-1-2	Single vertical wire test
	IEC 60754-1	No halogens
	IEC 60754-2	No acid matters
	IEC 61034-2	No dense smoke

## Performance Properties

Cable attenuation	IEC 60793-1-40
Maximum attenuation value of cable in the interval 1310 nm - 1625 nm	≤ 0.39 dB/km
Maximum attenuation value of cable at 1550 nm	≤ 0.25 dB/km
Inhomogeneity of OTDR trace for any two 1000 metre fibre lengths	Max. 0.1 dB/km

Group index of refraction	IEC 60793-1-22
Effective group index at 1310 nm	1.467
Effective group index at 1550 and 1625 nm	1.468

Standards and Norms	
IEC / EN 60793-2-50 Category B.1.3	EN 50 173-1:2007, cat. OS2 and OS1
ITU-T Recommendation G.652.D and C, B, A	ISO / IEC 11801:2002, cat. OS1
IEEE 802.3 - 2002 incl. 802.3ae	ISO / IEC 24702: 2006, cat. OS2 and OS1

Property	Standard	Value
Cladding diameter	IEC / EN 60793-1-20	125.0 ± 0.7 µm
Cladding non-circularity	IEC / EN 60793-1-20	≤ 0.7 %
Core - cladding concentricity error	IEC / EN 60793-1-20	≤ 0.5 µm
Primary coating diameter - coloured and natural	IEC / EN 60793-1-21	242 ± 7 µm
Primary coating non-circularity	IEC / EN 60793-1-21	≤ 5 %
Primary coating - cladding concentricity error	IEC / EN 60793-1-21	≤ 12 µm
Chromatic dispersion coefficient:	IEC / EN 60793-1-42	
	In the interval 1285 nm - 1330 nm	≤  3  ps/km • nm
	At 1550 nm	≤ 18.0 ps/km • nm
	At 1625 nm	≤ 22.0 ps/km • nm
Zero dispersion wavelength, λ <sub>0</sub>		1300 - 1322 nm
Zero dispersion slope>		≤ 0.090 ps/(nm <sup>2</sup> • km)
Cut-off wavelength	IEC / EN 60793-1-44	≤ 1260 λ <sub>cc</sub> nm *
Mode field diameter at 1310 nm	IEC / EN 60793-1-45	9.0 ± 0.4 µm
Mode field diameter at 1550 nm		10.1 ± 0.5 µm
Macrobending loss	IEC / EN 60793-1-47	
	100 turns on a ø 50 mm mandrel at 1310 and 1550 nm	≤ 0.05 dB
	100 turns on a ø 60 mm mandrel at 1625 nm	≤ 0.05 dB
Polarisation mode dispersion (PMD) coefficient, max. uncabled	IEC / EN 60793-1-48	≤ 0.5 ps/√km
PMD <sub>Q</sub> Link Design Value (calculated with Q=0.01%, N=20)	IEC / EN 60794-3	≤ 0.2 ps/√km
Proof stress level	IEC / EN 60793-1-30	≥ 0.7 (= 1 % strain) Gpa
Fibre curl radius	IEC / EN 60793-1-34	> 4 m
Strip force (peak)	IEC / EN 60793-1-32	1.2 ≤ F <sub>peak.strip</sub> ≤ 8.9 N
Dynamic fatigue resistance aged and unaged (N <sub>d</sub> )	IEC / EN 60793-1-33	≥ 20
Static fatigue resistance (N <sub>s</sub> )	IEC / EN 60793-1-33	≥ 23

\* guaranteed value according to the ITU-T (ATM G650) method

## Typical Applications

- 100GBASE-LX      ■ 10GBASE-LX4      ■ 10GBASE-LR/LW      ■ 10GBASE-ER/EW
- 40GBASE-LX      ■ 100GBASE-LX4      ■ 100GBASE-ER4
- 155 ATM      ■ 622 ATM      ■ 531 Fibre Channel      ■ 1062 Fibre Channel

## Part Number Information

Part No.	Description
205-356	Internal/External Grade SWA Fibre Cable 4 Core 9/125 OS2
205-368	Internal/External Grade SWA Fibre Cable 8 Core 9/125 OS2
205-360	Internal/External Grade SWA Fibre Cable 12 Core 9/125 OS2
205-370	Internal/External Grade SWA Fibre Cable 16 Core 9/125 OS2
205-362	Internal/External Grade SWA Fibre Cable 24 Core 9/125 OS2

## System Warranty

The Excel System Warranty provides a 25-year product and applications assurance of compliance with the industry performance standard appropriate to the class of cabling installed. The warranty may be applied for by an accredited Excel Partner who has designed, supplied and installed the said system.



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