

# Duct Installation Fiber Cable

NT-DUCT-xxx-yM-ZT - xxx=fiber count, y=length in meters



## Specifications:

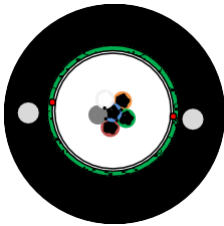
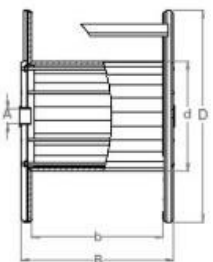
| Optical Fiber                                                                                                |                                                                                                   |                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Parameter                                                                                                    | Test                                                                                              | Specification                                                                                                        |
| Standard                                                                                                     | G.657A1                                                                                           |                                                                                                                      |
| Optical                                                                                                      | Fiber attenuation, cabled                                                                         | @1310, 1383nm $\leq 0.40$ dB/km, @1550, 1383nm $\leq 0.30$ dB/km                                                     |
|                                                                                                              | Mode field diameter (MFD)                                                                         | @1310nm $8.8 \pm 0.4 \mu\text{m}$                                                                                    |
|                                                                                                              | Zero dispersion wavelength                                                                        | 1300 ~ 1324nm                                                                                                        |
|                                                                                                              | Zero dispersion slope                                                                             | $\leq 0.092 \text{ ps/nm}^2 \cdot \text{km}$                                                                         |
|                                                                                                              | Polarisation mode dispersion (PMD)                                                                | $\leq 0.2 \text{ ps}/\sqrt{\text{km}}$                                                                               |
|                                                                                                              | Cut-off wavelength                                                                                | $\leq 1260 \text{ nm}$                                                                                               |
|                                                                                                              | Macro bending loss<br>10 turns $\varnothing 30 \text{ mm}$<br>1 turns $\varnothing 20 \text{ mm}$ | @1550 nm $\leq 0.25 \text{ dB}$<br>$\leq 0.75 \text{ dB}$<br>@1625 nm $\leq 1.0 \text{ dB}$<br>$\leq 1.5 \text{ dB}$ |
| Geometric                                                                                                    | Cladding diameter                                                                                 | $125 \pm 1.0 \mu\text{m}$                                                                                            |
|                                                                                                              | Core/clad concentricity error                                                                     | $\leq 0.5 \mu\text{m}$                                                                                               |
|                                                                                                              | Cladding non-circularity                                                                          | $\leq 1.0 \%$                                                                                                        |
| Mechanical                                                                                                   | Proof stress                                                                                      | $\geq 0.69 \text{ Gpa}$                                                                                              |
| Test Methods - All optical measurements at 1550nm                                                            |                                                                                                   |                                                                                                                      |
| Test                                                                                                         | Conditions                                                                                        | Specification                                                                                                        |
| Tensile strength IEC 60794-1-2 E1                                                                            | Tensile load: see Point 3<br>Sample length: $\geq 50 \text{ m}$ , 1 min                           | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Crush resistance IEC 60794-1-2 E3                                                                            | Crush: see Point 3<br>Test duration: 1 min, number of tests: 3                                    | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Impact IEC 60794-1-2 E4                                                                                      | Impact energy: 1 J; R = 300 mm<br>Impact points: 3; Impact number: 1                              | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Repeated bending IEC 60794-1-2 E6                                                                            | Bending radius: 20D<br>Cycles: 25 cycles                                                          | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Torsion IEC 60794-1-2 E7                                                                                     | Sample length: 2 m; Angles: $\pm 180^\circ$<br>Cycles: 5 cycles                                   | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Bend IEC 60794-1-2 E11A                                                                                      | Mandrel radius: 20D; Turn number: 4<br>Cycles: 3 cycles                                           | - $\Delta\alpha$ reversible after test<br>- No damage                                                                |
| Temperature cycling IEC 60794-1-2 F1                                                                         | Steps: $-40^\circ\text{C} \sim +70^\circ\text{C}$<br>Time per each step: 12 hours, Cycles: 2      | - $\Delta\alpha \leq 0.15 \text{ dB/km}$                                                                             |
| Dimensions                                                                                                   |                                                                                                   |                                                                                                                      |
| Number of fibers                                                                                             | 2 - 432                                                                                           |                                                                                                                      |
| Fibers per ribbon                                                                                            | 12                                                                                                |                                                                                                                      |
| Intermittent ribbon count                                                                                    | 36                                                                                                |                                                                                                                      |
| Cable OD                                                                                                     | .60" (15.3mm) $\pm 5\%$                                                                           |                                                                                                                      |
| Cable weight                                                                                                 | 463 Lb (210kg) /km $\pm 15\%$                                                                     |                                                                                                                      |
| Note: Sheath thickness not consider ripcord portion, sizes and values without tolerances are nominal values. |                                                                                                   |                                                                                                                      |
| Mechanical Properties                                                                                        |                                                                                                   |                                                                                                                      |
| Fiber counts                                                                                                 | 2 - 432                                                                                           |                                                                                                                      |
| Max. tensile load                                                                                            | 1500N                                                                                             |                                                                                                                      |
| Crush resistance                                                                                             | 1000N/10cm                                                                                        |                                                                                                                      |
| Min. bending radius                                                                                          | 20 x OD (Installation), 15 x OD (Operation)                                                       |                                                                                                                      |

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Fiber optic cables must be rigid yet flexible enough to be installed into duct systems. Nanda Technologies can supply a range of fiber optic cables including duct fiber cables. Our duct fiber optic cables are metallic and dielectric cables. The number of fibers is from 2 to 432 fibers. The duct fiber optic cable is with aluminum foil as the moisture barrier layer, aramid, and Kevlar is for tensile strength support. Glass yarn or polyamide is used to prevent rodents.

| Application / Construction                                                                                                             |            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
|----------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------------|-----------|-----------------|-----------------|-----|-------|---------------------------------------------------------------------------------------|--------|-----------------|-----------|
| Identification                                                                                                                         |            | NT-GYDXPWNT-432 G.657A1                                                                                                                                                                                                                                                                                                                                                                                             |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Application                                                                                                                            |            | Duct Installation Cable                                                                                                                                                                                                                                                                                                                                                                                             |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Cross section<br>(not to scale)                                                                                                        |            | 432 fibers                                                                                                                                                                                                                                                                                                                                                                                                          |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
|                                                                                                                                        |            |                                                                                                                                                                                                                                                                                                                                    |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Configuration                                                                                                                          |            | <ul style="list-style-type: none"><li>• Intermittent ribbon with 12 optical fibers</li><li>• Ribbon unit (Each ribbon unit contain a bundle of 6 intermittent ribbon and water blocking yarns)</li><li>• Water-blocking tape and yarns</li><li>• Armor: corrugated steel tape, 2 ripcords under the tape</li><li>• Outer sheath: HDPE, black, sheath</li><li>• 2 FRP embedded in the sheath symmetrically</li></ul> |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Temperature range                                                                                                                      |            | Storage, transport, operation: -4 - 158°F (-20 - +70°C), Installation: 14 - 122°F (-10 to +50°C)                                                                                                                                                                                                                                                                                                                    |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Standards                                                                                                                              |            | IEC 60793-1, IEC 60793-2, IEC 60794-3-10                                                                                                                                                                                                                                                                                                                                                                            |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Markings                                                                                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Fiber colors                                                                                                                           |            | 1                                                                                                                                                                                                                                                                                                                                                                                                                   | 2               | 3             | 4         | 5               | 6               | 7   | 8     | 9                                                                                     | 10     | 11              | 12        |
|                                                                                                                                        |            | blue                                                                                                                                                                                                                                                                                                                                                                                                                | orange          | green         | brown     | slate           | white           | red | black | yellow                                                                                | violet | rose            | turquoise |
| Ribbon binder colors                                                                                                                   |            | 1                                                                                                                                                                                                                                                                                                                                                                                                                   | 2               | 3             | 4         | 5               | 6               |     |       |                                                                                       |        |                 |           |
|                                                                                                                                        |            | blue & blue                                                                                                                                                                                                                                                                                                                                                                                                         | Orange & orange | Green & green | Red & red | Violet & violet | Yellow & yellow |     |       |                                                                                       |        |                 |           |
| Logistics                                                                                                                              |            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| Cable type                                                                                                                             |            | Length                                                                                                                                                                                                                                                                                                                                                                                                              |                 |               |           | 1.24Mi (2Km)    |                 |     |       |  |        |                 |           |
|                                                                                                                                        |            | Tolerance                                                                                                                                                                                                                                                                                                                                                                                                           |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
| NT-GYDX-PW432NT                                                                                                                        | Drum type  | Wooden                                                                                                                                                                                                                                                                                                                                                                                                              |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
|                                                                                                                                        | Dimensions | 65" x 35.4" x 29.5" (165 x 90 x 75cm)                                                                                                                                                                                                                                                                                                                                                                               |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
|                                                                                                                                        | Weight     | 1,245.6Lbs (565Kg)                                                                                                                                                                                                                                                                                                                                                                                                  |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |
|                                                                                                                                        |            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |               |           |                 |                 |     |       |                                                                                       |        | D/d x B/b in cm |           |
| Dimensions including protection. Indicative values, actually delivered drum sizes and weights may deviate. Cable ends sealed with caps |            |                                                                                                                                                                                                                                                                                                                                                                                                                     |                 |               |           |                 |                 |     |       |                                                                                       |        |                 |           |