

# Finished cables

## Hybrid cable designs

**The core of Habia Cable's business model is in design** and manufacture of high specification, custom designed cables for demanding applications. Habia Cable's ability to take many and varied components and combine them into a working, composite cable that is fit for function both electrically and mechanically is one of the best in the industry.

Composite cables offer a key benefit in umbilical and reeling cables as a single composite cable can do the work of a strain cable, electrical cable, power cable and even a number of hydraulic hoses. Components can include (but are by no means limited to):

### Coaxials

With a wide variety of sizes and impedances available, Habia Cable are able to combine any of the RG Style, Multibend, Speedflex or Speedfoam coaxes within the design (Flexiform is not recommended for inclusion within composite cables due to its limited flex-life). Habia Cable is also frequently called upon to design customised coaxials for use within composite cables and these can be modified to feature varied impedances, additional screening or alternative sheaths and colours (including unsheathed coaxial cables).

### Data pairs

As with the coaxial cables, data and ethernet pairs are available in a range of sizes and impedances. Perhaps the most common are 90Ω (USB) and 100Ω (Cat 5) however 77Ω, 120Ω and 125Ω are also often requested. Depending on the performance requirements of the cable, Habia Cable can make these components using either PE, PTFE or FEP dielectrics.

### Power cores

Power cores can be varied in size and colour coding. They can also be electrically isolated from the rest of the cable if required.

### Signal cores

Probably the main component of any composite cable, signal wires can also be electrically isolated from the rest of the cable and are often specified as screened twisted pairs, triples and quads. Either colour coded or numbered (depending on size and cost) for ease of termination, Habia Cable can manufacture cables with hundreds of signal cores if required.

### Strain wires

Can be applied as either a single, central strain cores and/or overall braid. Multiple strain wires throughout the cable are occasionally requested, but these are inadvisable as they often move within the cable when placed under strain, damaging the other components of cable as they do so. The level of load that can be supported varies from cable to cable, but Habia Cable have had experience with cables that can take loads of several tonnes.

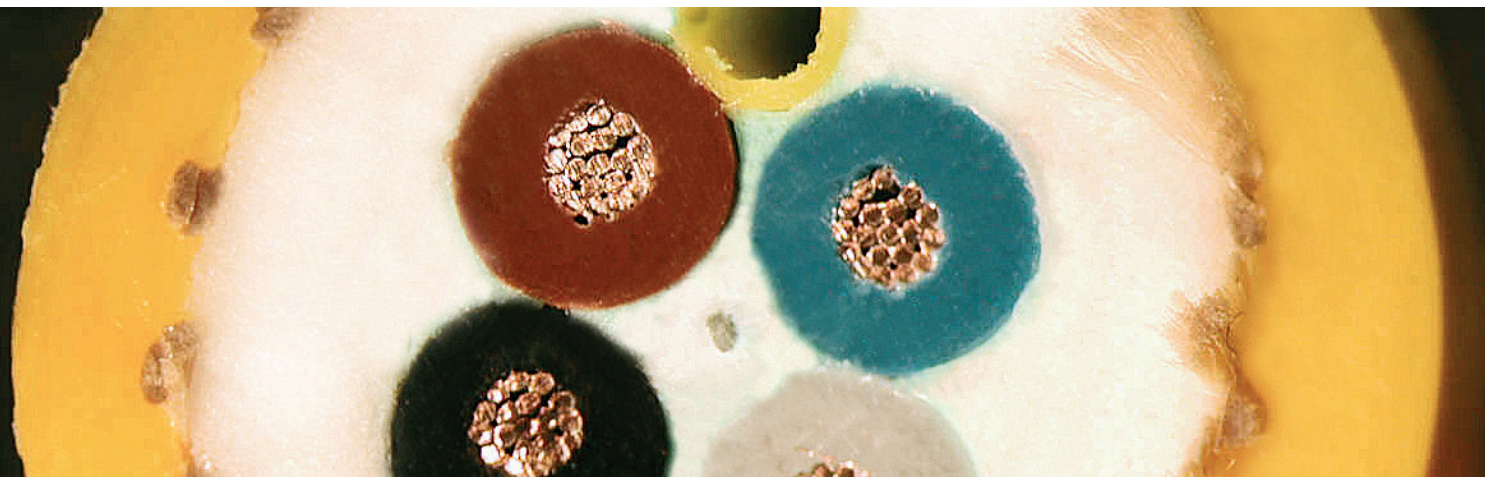
### Tubes

Vent tubes are incorporated within cables for a variety of purposes as they are able to provide air in the cable for cooling, they can aid the buoyancy of a cable and they can carry high pressure air or oil for pneumatic and hydraulic use.

Once arranged in a suitable lay-up that can be produced by machine, the cable will be cabled together with back-twist and alternating layer directions to ensure the best possible construction.

Braids of plated copper, stainless steel wire or aramid strands can be added.

Depending on the performance of the materials within the cable a wide variety of inner and outer sheaths can be applied over the whole construction. These sheaths can be marked with either Habia Cable's standard printing, designed to simply identify the cable for future reference, or with the customer's requested printing.



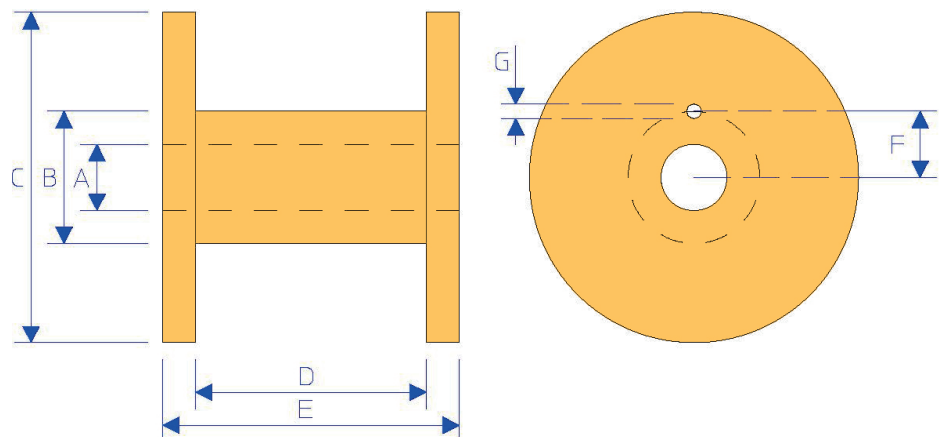
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Delivery, lengths and reels

| Delivery Spools |       |         |         |       |         |       |      |          |        |
|-----------------|-------|---------|---------|-------|---------|-------|------|----------|--------|
| Type            | A     | B       | C       | D     | E       | F     | G    | material | weight |
|                 | mm    | mm      | mm      | mm    | mm      | mm    | mm   |          | kg     |
| SD100/60K       | 16.5  | 60.0    | 100.0   | 38.0  | 45.0    | 25.0  | 3.5  | PS       | 0.06   |
| E 100           | 16.0  | 80.0    | 100.0   | 80.0  | 100.0   | 20.0  | 7.0  | PS       | 0.09   |
| E 125           | 16.0  | 80.0    | 125.0   | 100.0 | 125.0   | 20.0  | 7.0  | PS       | 0.15   |
| E 160           | 22.0  | 100.0   | 160.0   | 128.0 | 160.0   | 32.0  | 13.0 | PS       | 0.25   |
| E 200           | 22.0  | 125.0   | 200.0   | 160.0 | 200.0   | 32.0  | 13.0 | PS       | 0.45   |
| SH370K          | 305.0 | 311.0   | 370.0   | 70.0  | 80.0    | -     | -    | PS       | 0.41   |
| SD300K          | 51.5  | 212.0   | 300.0   | 91.0  | 103.0   | 44.5  | 11.0 | PS       | 0.65   |
| B60             | 33.0  | 110.0   | 255.0   | 148.0 | 165.0   | 43.5  | 11.5 | PP       | 0.60   |
| P3              | 75.0  | 110.0   | 280.0   | 265.0 | 285.0   | 43.5  | 9.5  | PP       | 0.73   |
| P4              | 75.0  | 175.0   | 400.0   | 300.0 | 340.0   | 62.0  | 20.0 | PP       | 2.00   |
| P5              | 75.0  | 202.0   | 480.0   | 340.0 | 380.0   | 65.0  | 20.0 | PP       | 2.00   |
| K6              | 75.0  | 250.0   | 600.0   | 400.0 | 464.0   | 100.0 | 40.0 | Wood     | 12.00  |
| K7              | 75.0  | 325.0   | 700.0   | 500.0 | 576.0   | 100.0 | 40.0 | Wood     | 20.00  |
| K8              | 75.0  | 375.0   | 800.0   | 500.0 | 576.0   | 100.0 | 40.0 | Wood     | 25.00  |
| K9              | 75.0  | 425.0   | 900.0   | 550.0 | 627.0   | 100.0 | 10.0 | Wood     | 34.00  |
| K10             | 107.0 | 500.0   | 1,000.0 | 600.0 | 715.0   | 150.0 | 50.0 | Wood     | 46.00  |
| K11             | 107.0 | 575.0   | 1,100.0 | 650.0 | 765.0   | 150.0 | 50.0 | Wood     | 55.00  |
| K12             | 107.0 | 675.0   | 1,200.0 | 850.0 | 980.0   | 300.0 | 50.0 | Wood     | 90.00  |
| K14             | 107.0 | 800.0   | 1,400.0 | 850.0 | 980.0   | 300.0 | 50.0 | Wood     | 115.00 |
| K16             | 107.0 | 950.0   | 1,600.0 | 850.0 | 1,012.0 | 300.0 | 50.0 | Wood     | 195.00 |
| K18             | 132.0 | 1,100.0 | 1,800.0 | 850.0 | 1,012.0 | 500.0 | 65.0 | Wood     | 230.00 |
| K250            | 33.0  | 155.0   | 250.0   | 160.0 | 200.0   | 30.0  | 13.0 | PS       | 1.05   |
| K355            | 33.0  | 220.0   | 355.0   | 160.0 | 200.0   | 80.0  | 25.0 | PS       | 1.85   |
| H400            | 35.0  | 200.0   | 400.0   | 200.0 | 230.0   | 85.0  | 22.0 | Wood     | 3.00   |
| H470            | 35.0  | 200.0   | 470.0   | 230.0 | 250.0   | 85.0  | 22.0 | Wood     | 3.50   |

Habia Cable delivers on a number of standard spool sizes provided that the inner diameter of the spool remains consistent with the MBR (Minimum Bend Radius) of the cable. Habia Cable will supply the cable with all ends out and capped

unless otherwise specified. A number of different types are available: Plastic spools in PP or PS and Wooden spools. Additionally, Habia Cable can supply in crates and barrels depending on the product. Please ask for details.



# Finished cables

## Recommended bend radius

| Recommended MBR                     |                              |  |
|-------------------------------------|------------------------------|--|
| Type of usage                       | Minimum Bend Radius (MBR)    | Definition                                       |
| Static (installation)               | 5x overall cable diameter    | Flexed into position - no further movement       |
| Flexing                             | 10x overall cable diameter   | General motion (e.g. unsupported cable movement) |
| Dynamic                             | 20x overall cable diameter   | High frequency use (e.g. drag-chain)             |
| <hr/>                               |                              |  |
| Static (installation) - Habiatron Q | 7.5x overall cable diameter  | Flexed into position - no further movement       |
| Flexing - Habiatron Q               | 15x overall cable diameter   | General motion (e.g. unsupported cable movement) |
| Dynamic - Habiatron Q               | Not suitable for dynamic use | High frequency use (e.g. drag-chain)             |

### Flexibility and flex-life are two very different aspects

of bending a cable, however each has an impact on the recommended bend radius of the cable.

#### Flexibility

Flexibility indicates the unsupported 'drape' of a cable. Cables with highly stranded conductors, more elastic insulations and sheaths (such as rubber) and loosely braided screens will give a much better level of flexibility than harder materials such as fluoropolymers.

#### Flex-life

Flex-life gives an indication of how many times a cable can be repeatedly flexed without failure. Some aspects in the cable make-up are similar to flexibility when it comes to a good lay-up, such as highly stranded conductors and loose braids, however others can differ as friction plays a more significant part and as such strong, low-friction materials such as fluoropolymers can work much better than soft, weak materials such as rubber.

### Recommended MBR

Recommendations are based on Habia Cable's understanding of our materials and experience gained on similar product types.

Given that the lay-up and bending properties of every cable are different, and that even minor changes in cable materials and lay-up can have significant effects on the flexibility and particularly the flex-life, then it is strongly recommended that the specific cable should be tested.

Habia Cable is unable to accept any liability and the use of this data is at the customer's discretion and risk.

It should be noted that figures stated here are guideline values only. Some cables like Hi-Flex may well be able to exceed these figures whilst other products with heavily filled, screened and armoured constructions may struggle to achieve the values quoted here.

