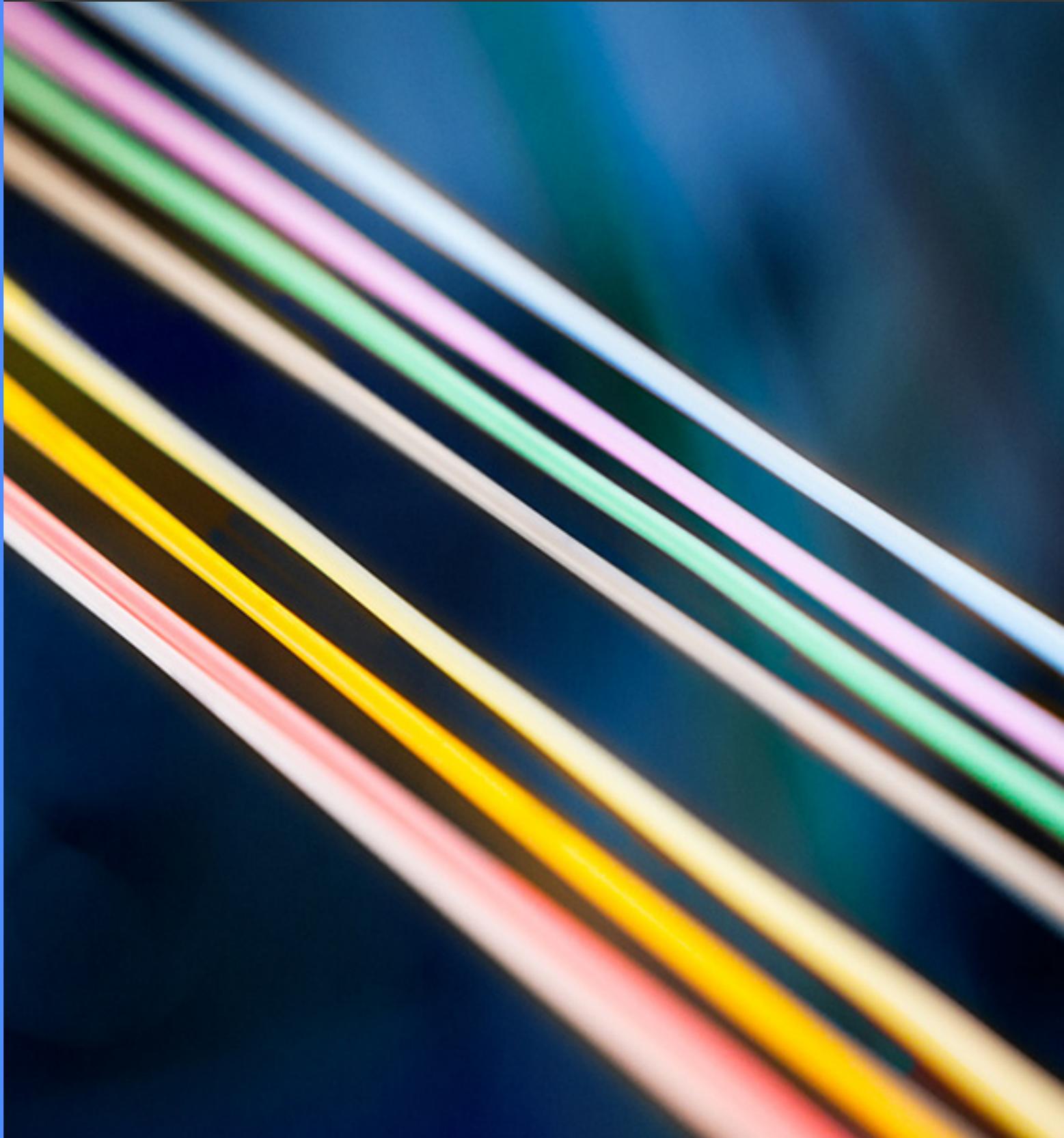




Whitepaper

Color Codes and Counting Directions for Fiber Optic Cables





About Color Code Systems

Fibers, tubes and ribbons in fiber optic cables are marked with different colors and bar codes to facilitate identification. Hexatronic offers cables with color code systems according to all international and national standards and for all types of fiber optic cables. Custom specific color code systems are available on request.

This document describes the most common color code standards for cable designs, namely:

- TIA/EIA-598 (Bellcore)
- S12
- DIN-0888
- Standard Type E
- FIN2012

All systems are characterized by using 12 different colors to identify fibers that are grouped together in a common bundle such as a tube, ribbon, yarn wrapped bundle or other types of bundle. In all charts in this document, all types of bundles are referred to as “tubes”. If more than 12 fibers or tubes are to be separated, the color sequence is normally repeated, but with ring marks or lines on the colored fibers and tubes. Some systems such as the Standard Type E use only a few tube colors and the tube is identified by its position in the cable.

Color Codes and Counting Directions for Fiber Optic Cables

This chart is a quick reference guide for identification of fibers and tubes in the most common cable designs. Detailed information about the color code systems for all cable types are available in the following pages.

TIA-598 Fibers and Tubes	1	2	3	4	5	6	7	8	9	10	11	12
	Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Rose	Aqua
	13	14	15	16	17	18	19	20	21	22	23	24
	Blue —	Orange —	Green —	Brown —	Slate —	White —	Red —	Clear —	Yellow —	Violet —	Rose —	Aqua —

S12 Fibers and Tubes	1	2	3	4	5	6	7	8	9	10	11	12
	Red	Blue	White	Green	Yellow	Grey	Brown	Black	Violet	Orange	Turquoise	Pink
	13	14	15	16	17	18	19	20	21	22	23	24
	Red —	Blue —	White —	Green —	Yellow —	Grey —	Brown —	Clear —	Violet —	Orange —	Turquoise —	Pink —

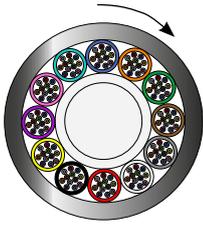
DIN-0888 Fibers and Tubes	1	2	3	4	5	6	7	8	9	10	11	12
	Red	Green	Blue	Yellow	White	Grey	Brown	Violet	Turquoise	Black	Orange	Pink
	13	14	15	16	17	18	19	20	21	22	23	24
	Red —	Green —	Blue —	Yellow —	White —	Grey —	Brown —	Violet —	Turquoise —	Clear —	Orange —	Pink —

FIN-2012 Fibers and Tubes	1	2	3	4	5	6	7	8	9	10	11	12
	Blue	White	Yellow	Green	Grey	Orange	Brown	Turquoise	Black	Violet	Pink	Red
	13	14	15	16	17	18	19	20	21	22	23	24
	Blue —	White —	Yellow —	Green —	Grey —	Orange —	Brown —	Turquoise —	Clear —	Violet —	Pink —	Red —

Type-E Fibers	1	2	3	4	5	6	7	8	9	10	11	12
	Red	Blue	White	Green	Yellow	Grey	Brown	Black	Orange	Violet	Pink	Turquoise
	13	14	15	16	17	18	19	20	21	22	23	24
	Red —	Blue —	White —	Green —	Yellow —	Grey —	Brown —	Clear —	Orange —	Violet —	Pink —	Turquoise —

Type-E Tubes	1	2	3-6				7	8-16				
	Red	Blue	White				Blue	White				

Counting direction



TIA/EIA-598 (Bellcore)

This color code, formerly referred as the “Bellcore”-standard, is the most recognized system worldwide. Since this standard emerges from United States, the colors are named according to US English norms, e.g. Slate (Grey), Rose (Pink) and Aqua (Turquoise).

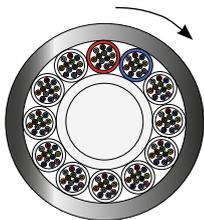
Fiber and tube color coding:

1	2	3	4	5	6	7	8	9	10	11	12
Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Rose	Aqua
13	14	15	16	17	18	19	20	21	22	23	24
Blue —	Orange —	Green —	Brown —	Slate —	White —	Red —	Clear —	Yellow —	Violet —	Rose —	Aqua —

If fiber 13-24 are used in a loose tube design, the color sequence is repeated for fiber 13-24, but fibers are ring marked. Fiber 20 is clear (uncolored) since black ring marking will not be visible on black colored fibers.

For cable designs with several layers of tubes, the counting starts in the innermost layer.

Counting direction



S12

The S12 color code was introduced in 2012 by Skanova (Sweden) to be used for micro cables and nano cables. The standard is now widely used in Sweden and other countries.

Fiber and tube color coding:

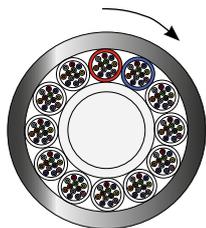
1	2	3	4	5	6	7	8	9	10	11	12
Red	Blue	White	Green	Yellow	Grey	Brown	Black	Violet	Orange	Turquoise	Pink
13	14	15	16	17	18	19	20	21	22	23	24
Red —	Blue —	White —	Green —	Yellow —	Grey —	Brown —	Clear —	Violet —	Orange —	Turquoise —	Pink —

If fiber 13-24 are used in a loose tube design, the color sequence is repeated for fiber 13-24, but fibers are ring marked. Fiber 20 is clear (uncolored) since ring marking will not be visible on black colored fibers.

For cable designs with several layers of tubes, the counting starts in the innermost layer.

For S12 marking of ribbon cables, see following sections.

Counting direction



DIN-0888

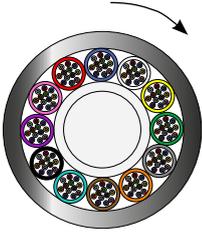
The DIN-0888 color code is the most common color code system in Germany, but also used in other countries such as Switzerland, Austria and Denmark.

Fiber and tube color coding:

1	2	3	4	5	6	7	8	9	10	11	12
Red	Green	Blue	Yellow	White	Grey	Brown	Violet	Turquoise	Black	Orange	Pink
13	14	15	16	17	18	19	20	21	22	23	24
Red —	Green —	Blue —	Yellow —	White —	Grey —	Brown —	Violet —	Turquoise —	Clear —	Orange —	Pink —

If fiber 13-24 are used in a loose tube design, the color sequence is repeated for fiber 13-24, but fibers are ring marked. Fiber 22 is clear (uncolored) since ring marking will not be visible on black colored fibers.

Counting direction



FIN2012

The FIN2012 is a color code standard used in Finland.

Fiber and tube color coding:

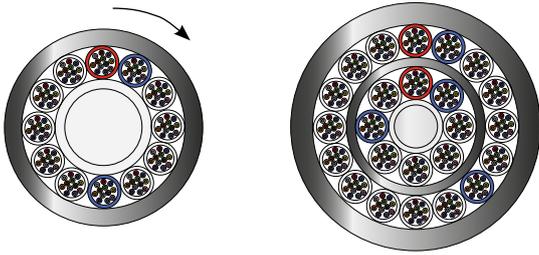
1	2	3	4	5	6	7	8	9	10	11	12
Blue	White	Yellow	Green	Grey	Orange	Brown	Turquoise	Black	Violet	Pink	Red
13	14	15	16	17	18	19	20	21	22	23	24
Blue —	White —	Yellow —	Green —	Grey —	Orange —	Brown —	Turquoise —	Clear —	Violet —	Pink —	Red —

If fiber 13-24 are used in a loose tube design, the color sequence is repeated for fiber 13-24, but fibers are ring marked. Fiber 21 is clear (uncolored) since ring marking will not be visible on black colored fibers.

Tube colors for cables with more than one layer according to FIN2012 will differ depending on cable design.

Please contact Hexatronic for more information.

Counting direction



Standard Type E

Standard color code system originally jointly defined by Televerket (Telia) and Ericsson in Sweden. The system is used worldwide but is gradually replaced by the S12 and TIA/EIA-598 systems in many regions.

Fiber color coding:

1	2	3	4	5	6	7	8	9	10	11	12
Red	Blue	White	Green	Yellow	Grey	Brown	Black	Orange	Violet	Pink	Turquoise
13	14	15	16	17	18	19	20	21	22	23	24
Red —	Blue —	White —	Green —	Yellow —	Grey —	Brown —	Clear —	Orange —	Violet —	Pink —	Turquoise —

If fiber 13-24 are used in a loose tube design, the color sequence is repeated for fiber 13-24, but fibers are ring marked. Fiber 20 is clear (uncolored) since ring marking will not be visible on black colored fibers.

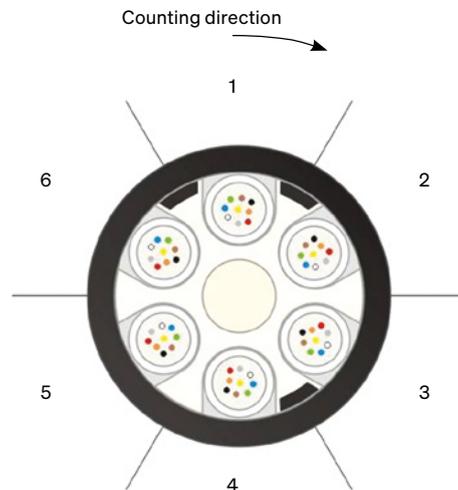
Tube color coding:

1	2	3-6	7	8-16
Red	Blue	White	Blue	White

The color sequence is repeated on additional tube layers and starts with 1 (red) on each layer.

Exceptions:

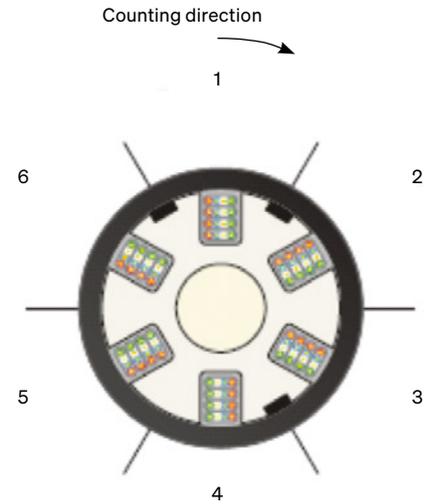
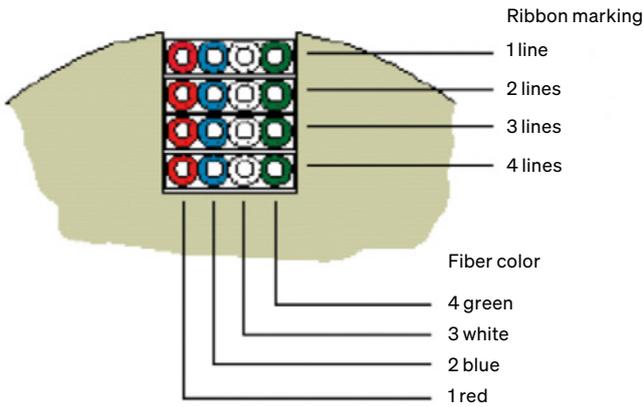
Tube identification in slotted core loose tube cables can alternatively be done by identifying the three line markings on the slotted core profile as shown in the figure to the right. Note that there is always only three line markings regardless the number of slots.



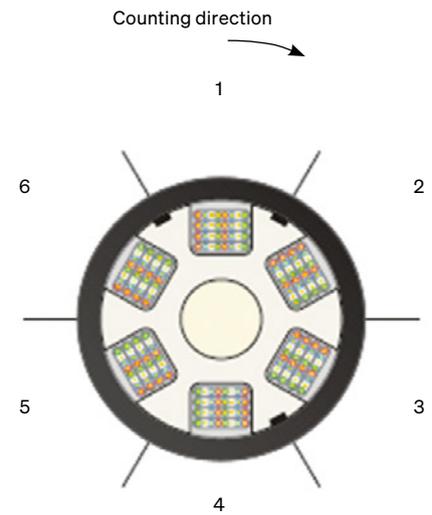
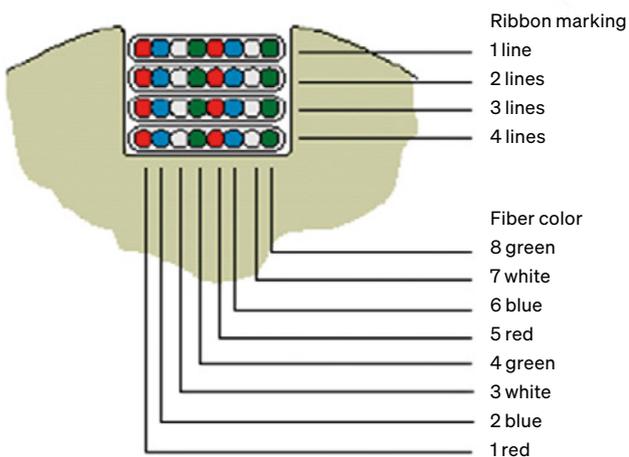
Fiber Ribbon Cables

This section describes the color codes for fiber ribbon cables according to both the S12 system, (method 1 with stripe markings) and Standard Type E.

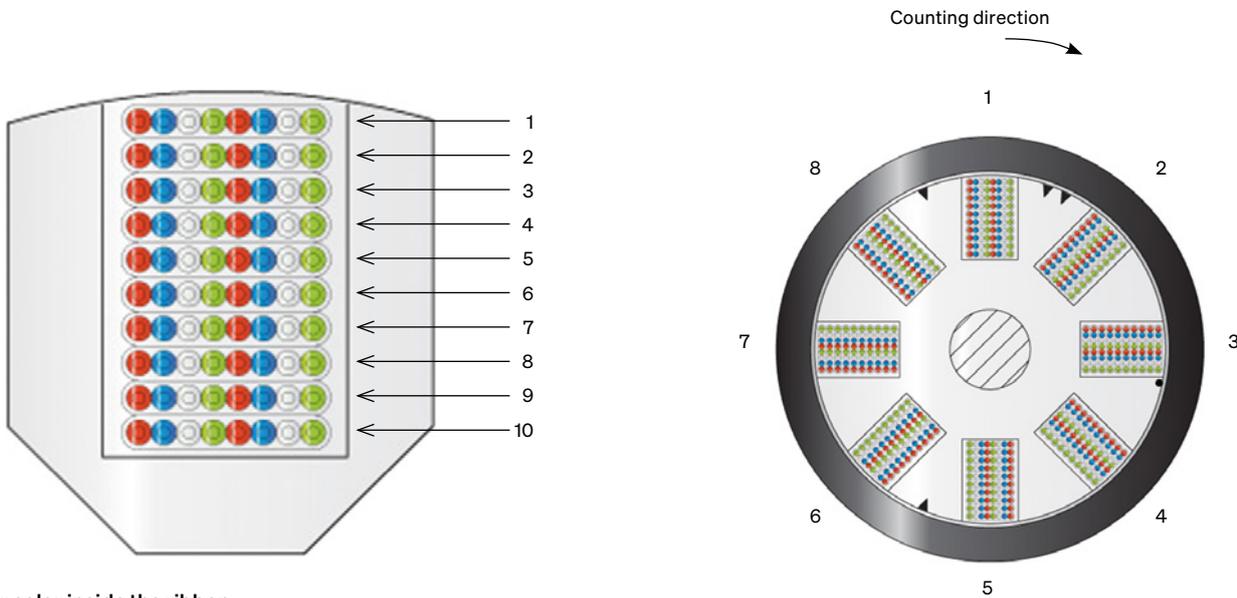
Slotted Core Profile, 4-fiber Ribbon



Slotted Core Profile, 8-fiber Ribbon, 8 to 192 Fibers



Slotted Core Profile, 8-fiber Ribbon, 288 to 640 Fibers



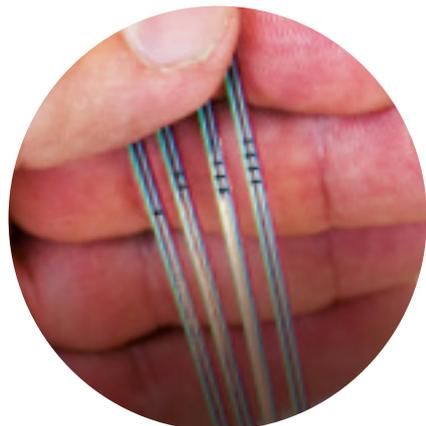
Fiber color inside the ribbon:
Red, Blue, White, Green, Red, Blue, White, Green

Note about fiber ribbon cables and the S12 system:

To identify ribbons in a fiber ribbon cable there are two allowed methods in the S12 system:

1. Marking with stripes on each ribbon in each slot
2. Making each ribbon unique in each slot by deviating from the color sequence in the table above.
Each ribbon will have its own color sequence.

Method 1 is by far the most convenient since the ribbon is easily identified without the need to consult complicated color charts. Only 4 different colors are used for fibers in the ribbon and these are the same for every ribbon. It is also much easier to identify the ribbons in low light or monochrome lightning situations. Method 1 is therefore superior, but also requires that the cable manufacturer can make stripe markings on the ribbon that will not wear out and that will not affect the optical properties of the fibers. Since this process is difficult to master, method 2 was introduced by some manufacturers in 2013.



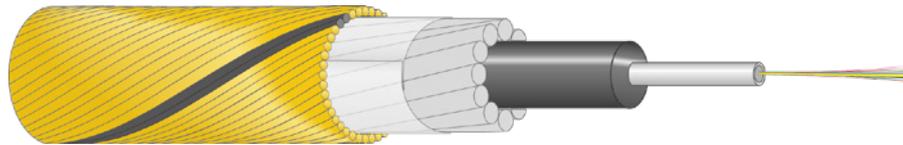
Hexatronic has a long experience in stripe marking of ribbons and with its unique production capabilities, stripe marking is the standard method to separate ribbons. This guideline will therefore only describe the preferred method 1.

Submarine Cables (Loose Tube)

The fibers are grouped in bundles of 12 fibers. The groups are held together with yarn of different colors to be able to separate the bundles.

Color coding of the fibers (bundle with yarn)

- Fiber 1 Red
- Fiber 2 Blue
- Fiber 3 White
- Fiber 4 Green
- Fiber 5 Yellow
- Fiber 6 Grey
- Fiber 7 Brown
- Fiber 8 Black
- Fiber 9 Orange
- Fiber 10 Violet
- Fiber 11 Pink
- Fiber 12 Turquoise



Yarn color

- Yarn 1 - Red (fibers 1-12)
- Yarn 2 - Blue (fibers 13-24)
- Yarn 3 - White (fibers 25-36)
- Yarn 4 - Green (fibers 37-48)

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