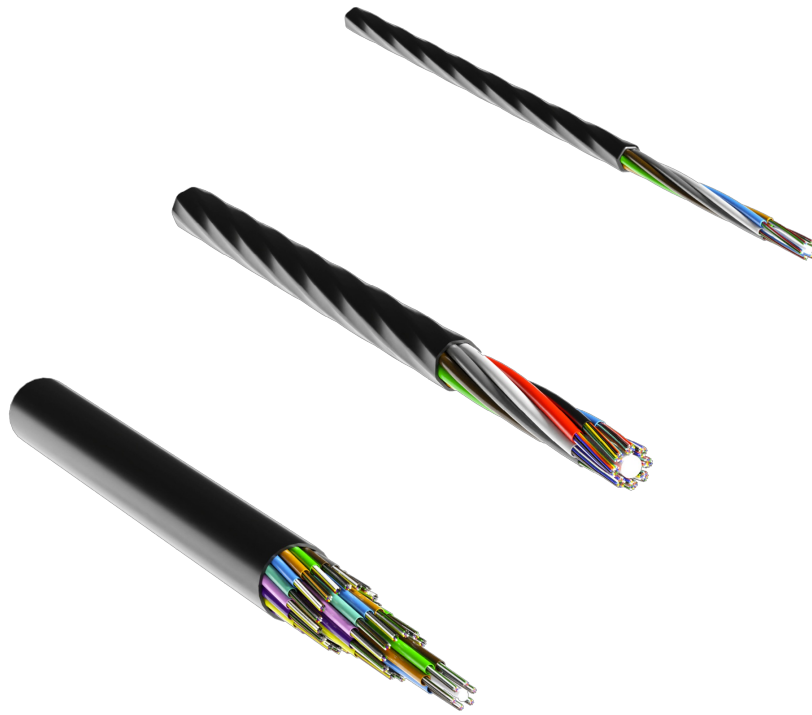


VIPER™



# High Performance Micro Cable

12-432 fibers G657A1 TIA598

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## Features

- Up to 432 fibers
- Super slim design
- Excellent installation performance
- Unique design with robust inner tubes that do not kink
- Temperature range from -45 to +70°C
- Excellent bend performance,  $\geq 70$  mm
- Easy to prepare and identify fibers
- Ultra low attenuation in cable

## Application

The Hexatronic Viper series of micro cables are characterized by state of the art installation performance when installed by blowing into microducts. Particularly, installations in access networks with difficult routes, which are facilitated by the enhanced performance of the Viper cables.

All parameters such as cable diameter, sheath friction, cable stiffness etc are optimized for best installation performance without compromising mechanical or environmental properties

The micro cables are based on a slim loose tube design with up to 36 tubes per cable. The design facilitates fiber preparation and mid-span access. The cables are suitable for long-distance, air blown installation in microducts, with an inner diameter of as little as 8 to 12 mm. The cables have excellent bend performance and an extremely wide operational temperature range.

## Design

The Micro Cables are designed with one, two or three layers of inner protective tubes made of a unique Polyamide compound. The Polyamide gives a special strength to the product, while increasing the bending properties as well as other benefits such as extreme temperature resistance. Each tube contains 12 or 24 fibers. As a result, The Viper Micro Cables are more durable during the installation process as they are able to withstand rough handling. The unique cable design with an extended operational temperature range of -45 to +70°C can be used in many environments, on all continents where heat and cold are often a major concern.

## Product Information



- 1 Primary coated fiber: Silica, acrylate
- 2 Loose tube: PA
- 3 Central strength member: Glass fiber reinforced plastic, PE
- 4 Slit up yarn: Aramide yarn
- 5 Wrapping: Water blocking yarns
- 6 Sheath: Polyethylene, halogen-free

Black fillers can replace empty white tubes.

## Technical Information

<b>Product Color</b>	Black Sheath
<b>Color Code</b>	TIA598
<b>Temperature, Operation [°C]</b>	-45 to +70
<b>Temperature, Storage [°C]</b>	-45 to +70
<b>Temperature, Installation [°C]</b>	-15 to +50
<b>Water Blocking</b>	Longitudinal water blocking according to IEC 60794-1-2-F5C

<b>Fiber Type</b>	G657A1
<b>Attenuation @Wavelength [nm]</b>	1310/1383/1550
<b>Typical Attenuation [dB/km]</b>	0.32/0.32/0.18
<b>Average Attenuation [dB/km]</b>	0.33/0.33/0.21
<b>Maximum Attenuation [dB/km]</b>	0.36/0.36/0.23
<b>Conformance</b>	<p>Fiber parameters and tests according to the IEC series 60793-2 and 60793-1. Mechanical and environmental tests in accordance with Family Specification IEC 60794-5-10.</p> <p>Test standards, conditions and requirements:</p> <ul style="list-style-type: none"> <li>▪ Operational temperature: IEC 60794-1-22 Method F1; max attenuation 0.05dB/km*</li> <li>▪ Storage temperature: IEC 60794-1-22 Method F1; max attenuation 0.15dB/km* reversible</li> <li>▪ Ageing: IEC 60794-1-22, Method F9; 168h@85°C,+2 cycles, no attenuation after test</li> <li>▪ Water blocking: IEC 60794-1-2, Method F5C, 3m sample, 1m head of water, no leakage after 24 hours</li> <li>▪ Bend radius: IEC 60794-1-21, Method E11B; 4 turns, 3 cycles, max attenuation 0.05dB*</li> <li>▪ Installation tensile load: IEC 60794-1-21, Method E1; max fiber tension 0.6%, reversible attenuation</li> <li>▪ Crush: IEC 60794-1-21, Method E3; 1 minute load, 100mm plate, no attenuation after test</li> <li>▪ Impact: IEC 60794-1-21, Method E4; 3 different places, max attenuation 0.1dB* after test</li> </ul> <p>* All attenuation measurements performed @ 1550nm</p>
<b>Marking</b>	The cables are length marked in meters, and the tubes and fibers are color coded according to TIA598 (Bellcore).

**Installation Notes**

Typical installation performance:

- Ducts ID 8-10 mm, cable OD ≤6.7 mm: 2000 m
- Ducts ID 12 mm, cable OD ≤8.0 mm: 2000 m
- Ducts ID 15-16 mm, cable OD <11 mm: 2000 m, cable OD 11-12 mm: 1500 m

Installation performance verified on Hexatronic test track, according to IEC 60794. Installation performance is affected by the installed path, environmental conditions, installation equipment etc and actual performance may therefore deviate from the above specified values.

If the cable is installed by blowing the temperature shall be -15 to +40°C. The cable shall not be stored in direct sunlight. The sun may heat up the cable over the permitted temperature limit.

**Ordering Information**

Supplied lengths: 2, 4, 8 km

**Technical Details**

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

TIA 598 Color Code Chart

**Articles 46**

Article name	Color	No. of Fibers	Layout	Bend Radius [mm]	Tensile Force, Installation [N]	Crush [N/100 mm]	Impact [J]	Diameter Ø [mm]	Weight [kg/km]	Length [m]
<b>GNHL 2/T2 G657A1 TIA598</b> TOL4019033/2C	Black	2	1x2	75	430	1000	–	4.2	11.5	8000/K8, 4000/K7
<b>GNHL 4/T4 G657A1 TIA598</b> TOL4019033/4C	Black	4	1x4	75	430	1000	–	4.2	11.5	8000/K8, 4000/K7

Article name	Color	No. of Fibers	Layout	Bend Radius [mm]	Tensile Force	Crush [N/100 mm]	Impact [J]	Installation [N]	Diameter Ø [mm]	Weight [kg/km]	Length [m]
<b>GNHL 8/T4 G657A1 TIA598</b> TOL4019033/8C	Black	8	2x4	75	430	1000	–	4.2	11.5	8000/K8, 4000/K7	
<b>GNHL 12/T4 G657A1 TIA598</b> TOL4019033/12C	Black	12	3x4	75	430	1000	–	4.2	11.5	8000/K8, 4000/K7	
<b>GNHL 24/T4 G657A1 TIA598</b> TOL4019033/24C	Black	24	6x4	75	430	1000	–	4.2	11.5	8000/K8, 4000/K7	
<b>GNHLDV 12 G657A1 (1x12f) TIA598</b> TOL4019022/12C	Black	12	1x12	75	1200	2000	2	5.7	28	8000/K10, 4000/K8	
<b>GNHLDV 12 G657A1 TIA598 1000 m</b> H4019022/12C-1	Black	12	1x12	75	1200	2000	2	5.7	28	1000/K7	
<b>GNHLDV 12 G657A1 TIA598 500 m</b> H4019022/12C-2	Black	12	1x12	75	1200	2000	2	5.7	28	500/K7	
<b>GNHLDV 12 G657A1 TIA598 2000 m</b> H4019022/12C-3	Black	12	1x12	75	1200	2000	2	5.7	28	2000/K7	
<b>GNHLDV 12 G657A1 TIA598 4000 m</b> H4019022/12C-4	Black	12	1x12	75	1200	2000	2	5.7	28	4000/K8	
<b>GNHLDV 24 G657A1 (2x12f) TIA598</b> TOL4019022/24C	Black	24	2x12	75	1200	2000	2	5.7	28	8000/K10, 4000/K8	
<b>GNHLDV 24 G657A1 TIA598 1000 m</b> H4019022/24C-1	Black	24	2x12	75	1200	2000	2	5.7	28	1000/K7	
<b>GNHLDV 24 G657A1 TIA598 500 m</b> H4019022/24C-2	Black	24	2x12	75	1200	2000	2	5.7	28	500/K7	
<b>GNHLDV 24 G657A1 TIA598 2000 m</b> H4019022/24C-3	Black	24	2x12	75	1200	2000	2	5.7	28	2000/K7	
<b>GNHLDV 24 G657A1 TIA598 4000 m</b> H4019022/24C-4	Black	24	2x12	75	1200	2000	2	5.7	28	4000/K8	
<b>GNHLDV 36 G657A1 (3x12f) TIA598</b> TOL4019022/36C	Black	36	3x12	75	1200	2000	2	5.7	28	8000/K10, 4000/K8	
<b>GNHLDV 36 G657A1 TIA598 1000 m</b> H4019022/36C-1	Black	36	3x12	75	1200	2000	2	5.7	28	1000/K7	
<b>GNHLDV 36 G657A1 TIA598 500 m</b> H4019022/36C-2	Black	36	3x12	75	1200	2000	2	5.7	28	500/K7	
<b>GNHLDV 36 G657A1 TIA598 2000 m</b> H4019022/36C-3	Black	36	3x12	75	1200	2000	2	5.7	28	2000/K7	
<b>GNHLDV 36 G657A1 TIA598 4000 m</b> H4019022/36C-4	Black	36	3x12	75	1200	2000	2	5.7	28	4000/K8	
<b>GNHLDV 48 G657A1 (4x12f) TIA598</b> TOL4019022/48C	Black	48	4x12	75	1200	2000	2	5.7	28	8000/K10, 4000/K8	
<b>GNHLDV 48 G657A1 TIA598 1000 m</b> H4019022/48C-1	Black	48	4x12	75	1200	2000	2	5.7	28	1000/K7	
<b>GNHLDV 48 G657A1 TIA598 500 m</b> H4019022/48C-2	Black	48	4x12	75	1200	2000	2	5.7	28	500/K7	
<b>GNHLDV 48 G657A1 TIA598 2000 m</b> H4019022/48C-3	Black	48	4x12	75	1200	2000	2	5.7	28	2000/K7	

Article name	Color	No. of Fibers	Layout	Bend Radius [mm]	Tensile Force [N]	Crush [N/100 mm]	Impact [J]	Installation [N]	Diameter Ø [mm]	Weight [kg/km]	Length [m]
<b>GNHLDV 48 G657A1 TIA598 4000 m</b> H4019022/48C-4	Black	48	4x12	75	1200	2000	2	5.7	28	4000/K8	
<b>GNHLDV 72 G657A1 (6x12f) TIA598</b> TOL4019022/72C	Black	72	6x12	75	1200	2000	2	5.7	28	8000/K10, 4000/K8	
<b>GNHLDV 72 G657A1 TIA598 1000 m</b> H4019022/72C-1	Black	72	6x12	75	1200	2000	2	5.7	28	1000/K7	
<b>GNHLDV 72 G657A1 TIA598 500 m</b> H4019022/72C-2	Black	72	6x12	75	1200	2000	2	5.7	28	500/K7	
<b>GNHLDV 72 G657A1 TIA598 2000 m</b> H4019022/72C-3	Black	72	6x12	75	1200	2000	2	5.7	28	2000/K7	
<b>GNHLDV 72 G657A1 TIA598 4000 m</b> H4019022/72C-4	Black	72	6x12	75	1200	2000	2	5.7	28	4000/K8	
<b>GNHL 96/T12 G657A1 TIA598</b> TOL4019032/96C	Black	96	8x12	80	1200	1000	3	6.1	28	8000/K10, 4000/K8	
<b>GNHL 96/T12 G657A1 TIA598 T2000</b> H4019032/96C-3	Black	96	8x12	80	1200	1000	3	6.1	28	2000/K7	
<b>GNHL 96/T12 G657A1 TIA598 T4000</b> H4019032/96C-4	Black	96	8x12	80	1200	1000	3	6.1	28	4000/K8	
<b>GNHL 144/T24 G657A1 TIA598</b> TOL4019032/144C	Black	144	6x24	70	1600	2000	5	6.7	35	8000/K12, 4000/K10	
<b>GNHL 144/T24 G657A1 TIA598 T1000</b> H4019032/144C-1	Black	144	6x24	70	1600	2000	5	6.7	35	1000/K7	
<b>GNHL 144/T24 G657A1 TIA598 T500</b> H4019032/144C-2	Black	144	6x24	70	1600	2000	5	6.7	35	500/K7	
<b>GNHL 144/T24 G657A1 TIA598 T2000</b> H4019032/144C-3	Black	144	6x24	70	1600	2000	5	6.7	35	2000/K7	
<b>GNHL 144/T24 G657A1 TIA598 T4000</b> H4019032/144C-4	Black	144	6x24	70	1600	2000	5	6.7	35	4000/K10	
<b>GNHL 144/T12 G657A1 TIA598</b> TOL4019053/144C	Black	144	12x12	80	2000	2000	-	7.9	35	-	
<b>GNHLDV 192 G657A1 (8x24f) TIA598</b> TOL4019022/192C	Black	192	8x24	80	2500	5000	3	7.9	47	2000/K8, 8000/K12, 6000/K12, 4000/K10	
<b>GNHLDV 192 G657A1 TIA598 2000 m</b> H4019022/192C-3	Black	192	8x24	80	2500	5000	3	7.9	60	2000/K8	
<b>GNHL 288 T/12 G657A1 TIA598</b> TOL4019039/288C	Black	288	24x12	80	3000	2000	3	10.3	83	2000/K10, 4000/K12	
<b>GNHL 288/T12 G657A1 TIA-598 T2000</b> H4019039/288C-3	Black	288	24x12	80	3000	2000	3	10.3	28	2000/K10	
<b>GNHL 288/T12 G657A1 TIA-598 T4000</b> H4019039/288C-4	Black	288	24x12	80	3000	2000	3	10.3	28	4000/K12	
<b>GNHL 432/T12 G657A1 TIA598</b> TOL4019028/432C	Black	432	36x12	175	1800	2000	-	11.7	98	-	
<b>GNHL 432/T12 G657A1 TIA-598 T2000</b> H4019028/432C-3	Black	432	36x12	175	1800	2000	-	11.7	98	-	