



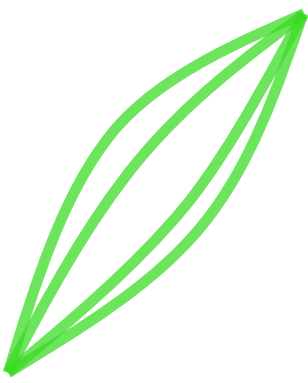
# *2024 Cable Catalog*

**Fiber Optic – Hybrid – Copper**



**Linden Photonics, Inc.**

**Harmonizing Opposing Goals:  
Strength & Flexibility**



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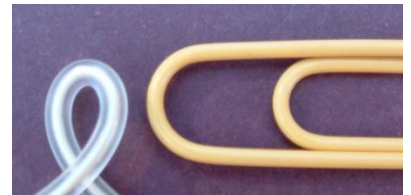


***STFOC***  
***Optical Cable***

**Non-Kink**  
**Crush Proof**



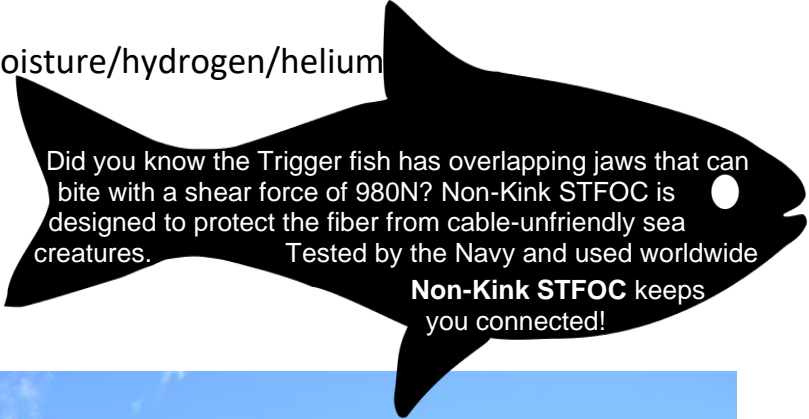
# STFOC



Linden's STFOC™ cables are available for a variety of underwater uses from munitions tethers to ROV controls to littoral water sensing. STFOC uses our patented cable jacket construction designed to protect the fiber in the harsh subsea environment. Non-Kink™ STFOC has a patented design to protect your fiber from the dangers of hockling. Compact and rugged; flexible and strong. Custom configurations available.

## Features

- Patented Liquid Crystal Polymer (LCP) jacketing (US Patent No. [7,570,853](#))
- Patented Non-Kink construction (US Patent No. [8,842,956](#))
- 100% thermoplastic jacket eliminates need for metal & Kevlar
- Non-Kink™ design prevents hockling
- Lightweight – LCP density:  $1.4\text{g}/\text{cm}^3$  compared to Inconel 625:  $8.4\text{g}/\text{cm}^3$
- Long continuous lengths >25km
- Hermetic coating protects fiber from moisture/hydrogen/helium
- Tight diameter tolerance
- Abrasion resistant



Did you know the Trigger fish has overlapping jaws that can bite with a shear force of 980N? Non-Kink STFOC is designed to protect the fiber from cable-unfriendly sea creatures. Tested by the Navy and used worldwide

**Non-Kink STFOC** keeps you connected!

## Advantages

- Crush proof
- Withstands high hydrostatic pressure
- Thin, lightweight, yet strong
- Non-corrosive
- No hydrogen outgassing
- Better moisture protection than carbon
- Precision windable
- High-Temp STFOC Available with operating temp of 180C



## Singlemode

Spec No.	Part No.	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7273</a>	1-SM-A-17-B-19	0.480	0.45	0.35	20	0.24
<a href="#">LINDEN-SPE-7090</a>	1-SM-A-17-B-20	0.500	0.45	0.35	20	0.4
<a href="#">LINDEN-SPE-7053</a>	1-SM-A-21-B-24	0.600	0.45	0.35	30	0.4
<a href="#">LINDEN-SPE-7034</a>	1-SM-A-27-B-30	0.762	0.45	0.35	50	0.6
<a href="#">LINDEN-SPE-7309*</a>	1-V-A-24-M-30	0.762	0.45	0.35	40	0.67
<a href="#">LINDEN-SPE-7092*</a>	1-V-A-27-R-35	0.890	0.45	0.40	50	1.0
<a href="#">LINDEN-SPE-7035</a>	3-SM-A-35-B-38	0.965	0.45	0.35	50	0.9
<a href="#">LINDEN-SPE-7394</a>	3-SM-A-35-R-40	1.02	0.45	0.35	50	0.97
<a href="#">LINDEN-SPE-7331</a>	1-RR-A-27-J-60	1.52	0.45	0.35	50	2.5
<a href="#">LINDEN-SPE-7043</a>	1-SM-A-35-Q-65	1.65	0.45	0.35	70	2.6
<a href="#">LINDEN-SPE-7196</a>	1-SM-A-35-Q-79	2.0	0.45	0.35	70	3.7
<a href="#">LINDEN-SPE-7057</a>	3-SM-A-35-Q-87	2.2	0.45	0.35	70	3.9
<a href="#">LINDEN-SPE-7329†</a>	1-SM-A-21-B-24-W-48-Q-95	2.4	0.45	0.35	300	9.0
<a href="#">LINDEN-SPE-7374</a>	6-FO-P-106	2.7	0.50	0.50	100	6.2
<a href="#">LINDEN-SPE-7039</a>	7-3-A-55-Q-125	3.2	0.45	0.35	60	9.0

\*Mid-Temp (150C) STFOC / †Stainless Steel Armored

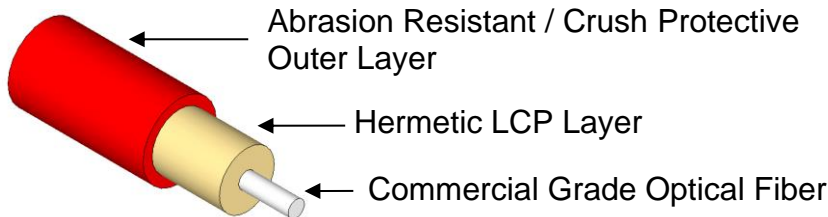
## Multimode (50/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1300nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7069</a>	1-F-A-21-B-24	0.600	3.5	3.0	30	0.4
<a href="#">LINDEN-SPE-7070</a>	1-F-A-27-B-30	0.762	3.5	3.0	50	0.6
<a href="#">LINDEN-SPE-7310*</a>	1-W-A-24-M-30	0.762	3.5	3.0	40	0.67
<a href="#">LINDEN-SPE-7182</a>	1-W-A-27-J-35	0.890	3.5	3.0	50	0.9
<a href="#">LINDEN-SPE-7071</a>	3-F-A-35-B-38	0.965	3.5	3.0	50	0.9
<a href="#">LINDEN-SPE-7044</a>	1-F-A-35-Q-65	1.65	3.5	3.0	70	2.6
<a href="#">LINDEN-SPE-7197</a>	1-F-A-35-Q-79	2.0	3.5	3.0	70	3.7

\*High-Temp (180C) STFOC

## Multimode (62.5/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1300nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7046</a>	1-I-A-35-Q-65	1.65	3.5	3.0	70	2.6
<a href="#">LINDEN-SPE-7198</a>	1-I-A-35-Q-79	2.0	3.5	3.0	70	3.7
<a href="#">LINDEN-SPE-7072</a>	7-I-A-55-G-125	3.2	3.5	3.0	60	9.0



CONTACT LINDEN FOR MORE DETAILED SPECIFICATIONS OR CUSTOM REQUIREMENTS



***Buoyant Cable***

**Floats**

**Strong**

**Neutrally Buoyant**



# Buoyant Cable

Linden's buoyant STFOC™ fiber optic cables are available for a variety of underwater uses from munitions tethers to ROV controls to mooring buoys.

Our lightweight, buoyant designs are customized to your needs. From neutrally buoyant designs to cable that will float on water, we can customize your size, buoyancy and

strength. Using Linden's patented cable jacket construction designed to protect the fiber in the harsh subsea environment, our cables are compact and rugged; flexible and strong.

## Features

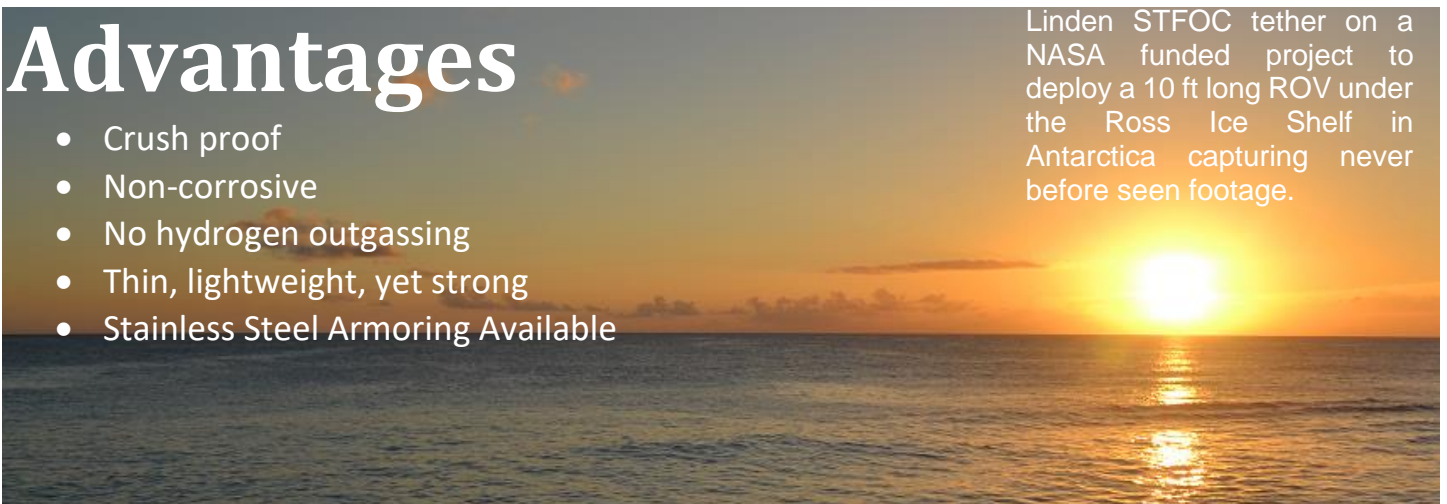
- From the thinnest, lightest 290µm cable to 13mm+ cables with multi-ton break strength
- Precise density control for positive, neutral or negative buoyancy
- Designs with or without Kevlar
- Non-Kink™ design prevents hocking
- Continuous lengths >5km
- Hermetic coating protects fiber from moisture Hydrogen & Helium for increased operational life
- Abrasion resistant



GA Tech used a 3.5 mm Linden STFOC tether on a NASA funded project to deploy a 10 ft long ROV under the Ross Ice Shelf in Antarctica capturing never before seen footage.

## Advantages

- Crush proof
- Non-corrosive
- No hydrogen outgassing
- Thin, lightweight, yet strong
- Stainless Steel Armoring Available







## Singlemode

Spec No.	Part No.	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Tensile Strength (lbs)	Density (s.g.)
<a href="#">LINDEN-SPE-7089</a>	1-FF-C-2-11-ORN	0.295	1.0	1.0	10	1.13
<a href="#">LINDEN-SPE-7263</a>	1-JJ-C-13	0.333	0.45	0.35	10	1.12
<a href="#">LINDEN-SPE-7040</a>	1-SM-C-20	0.500	0.35	0.25	10	0.95
<a href="#">LINDEN-SPE-7096</a>	1-SM-A-21-R-36-YEL	0.900	0.45	0.35	40	1.03
<a href="#">LINDEN-SPE-7260</a>	1-SM-A-21-R-33-B-36-YEL	0.915	0.45	0.30	45	1.045
<a href="#">LINDEN-SPE-7207</a>	1-SM-A-27-R-46-YEL	1.1	0.45	0.35	50	1.027
<a href="#">LINDEN-SPE-7073</a>	1-SM-A-27-L-67	1.7	0.45	0.35	50	1.02
<a href="#">LINDEN-SPE-7036</a>	1-SM-A-27-O-47-L-75	1.9	0.45	0.35	250	1.01
<a href="#">LINDEN-SPE-7411</a>	1-SM-J-36-O-56-L-85	2.2	0.45	0.35	250	0.95
<a href="#">LINDEN-SPE-7223</a>	1-SM-A-27-B-30-O-47-L-108	2.75	0.45	0.35	250	1.00
<a href="#">LINDEN-SPE-7055</a>	1-SM-A-27-O-67-L-137	3.5	0.45	0.35	450	0.99
<a href="#">LINDEN-SPE-7098</a>	1-SM-A-27-O-55-X-137	3.5	0.45	0.35	750	0.99
<a href="#">LINDEN-SPE-7401</a>	4-SM-V-102-O-122-FQ-140	3.55	0.45	0.35	250	1.03
<a href="#">LINDEN-SPE-7094</a>	1-SM-A-27-R-46-O-101-X-169-YEL	4.3	0.45	0.35	1,200	0.97
<a href="#">LINDEN-SPE-7281</a>	2-SM-V-63-O-134-FQ-174	4.4	0.50	0.50	1,350	1.03
<a href="#">LINDEN-SPE-7316*</a>	1-SM-A-21-B-24-W-48-FQ-185	4.7	0.45	0.35	300	0.95
<a href="#">LINDEN-SPE-7229</a>	1-SM-A-21-R-35-O-175-X-232	5.9	0.50	0.50	1,700	0.98
<a href="#">LINDEN-SPE-7305</a>	1-SM-A-27-B-30-O-120-FQ-250	6.35	0.45	0.35	1,300	0.75
<a href="#">LINDEN-SPE-7420</a>	1-SM-A-27-B-30-O-80-FQ-300	7.6	0.45	0.35	750	0.70
<a href="#">LINDEN-SPE-7137</a>	4-FO-L-183-O-242-L-370	9.4	0.60	0.60	2,750	0.97
<a href="#">LINDEN-SPE-7059</a>	1-SM-A-27-L-160-T-230-L-440-Q-520	13.2	0.60	0.40	2,750	1.03
<a href="#">LINDEN-SPE-7060</a>	3-SM-A-41-L-174-T-244-L-454-Q-534	13.6	0.40	0.30	2,750	1.02

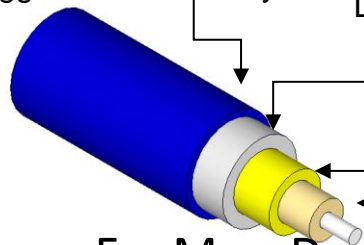
## Multimode (50/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1300nm (dB/km)	Tensile Strength (lbs)	Density (s.g.)
<a href="#">LINDEN-SPE-7074</a>	1-F-C-5-20	0.500	3.5	3.0	10	0.95
<a href="#">LINDEN-SPE-7075</a>	1-F-A-27-L-67	1.7	3.5	3.0	50	1.02
<a href="#">LINDEN-SPE-7076</a>	1-F-A-27-O-47-L-75	1.9	3.5	3.0	250	1.01
<a href="#">LINDEN-SPE-7412</a>	1-F-J-36-O-56-L-85	2.2	3.5	3.0	250	0.95
<a href="#">LINDEN-SPE-7456</a>	1-AC-V-63-O-85-L-120	3.0	3.0	1.0	450	1.0
<a href="#">LINDEN-SPE-7077</a>	1-F-A-27-O-67-L-137	3.5	3.5	3.0	450	0.99
<a href="#">LINDEN-SPE-7280</a>	4-FO-O-170-L-300-GG-340	6.6	3.5	3.0	450	1.03
<a href="#">LINDEN-SPE-7078</a>	1-F-A-27-L-160-T-230-L-440-Q-520	13.2	3.5	3.0	2,000	1.03

## Multimode (62.5/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1300nm (dB/km)	Tensile Strength (lbs)	Density (s.g.)
<a href="#">LINDEN-SPE-7093</a>	1-I-A-27-O-47-L-75	1.9	3.5	3.0	250	1.01
<a href="#">LINDEN-SPE-7091</a>	1-I-A-A-27-O-67-L-137	3.5	3.5	3.0	450	0.99

Optional Ruggedized Outer Layer



Low Density (Buoyant) Material

Optional Kevlar Strength Members

Hermetic LCP Layer

Commercial Grade Optical Fiber

**CONTACT LINDEN FOR MORE DETAILED SPECIFICATIONS OR CUSTOM REQUIREMENTS**

\*Stainless Steel Armored



*High Strength Cable*

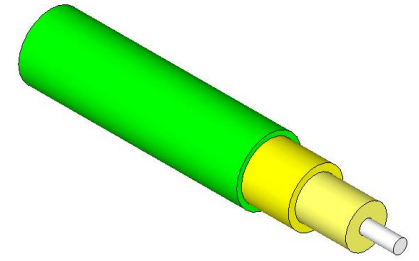
**Thin**

**Lightweight**

**Rugged**



# High Strength Cable



Linden's High Strength Non- Buoyant Cables are lightweight & flexible.

Rugged exterior, lightweight design and long continuous lengths give us an edge over competing cables. Using Linden's patented cable jacket construction designed to protect the fiber in the harsh subsea environment, our cables pull their weight.

## Features

- Over 2,500lbs. breaking strength
- Lightweight – LCP density:  $1.4\text{g/cm}^3$  compared to inconel 625:  $8.4\text{g/cm}^3$
- Continuous lengths >5km
- Hermetic coating protects fiber from moisture/hydrogen/helium
- Abrasion resistant

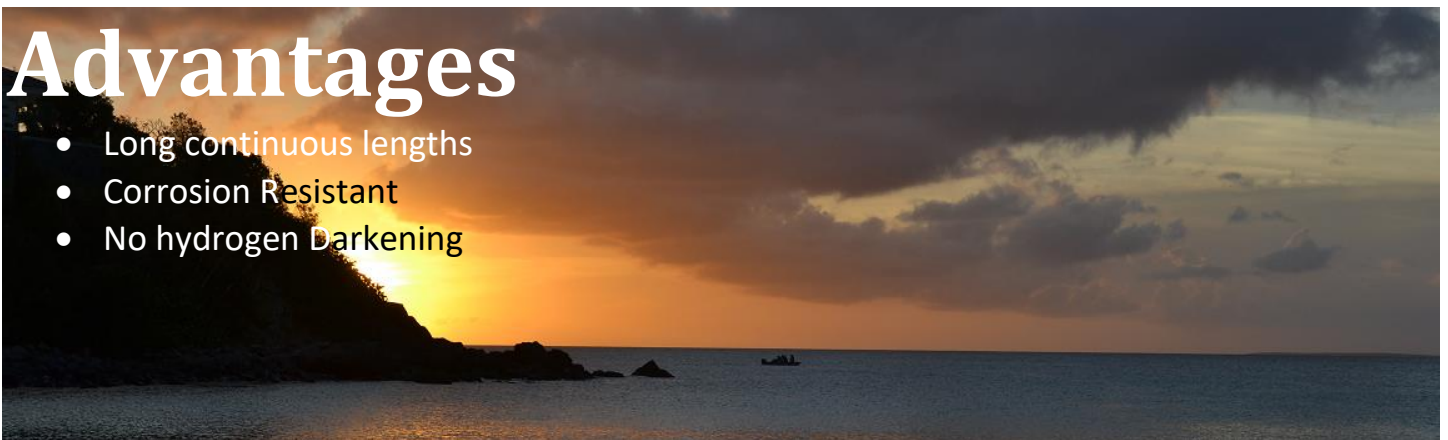


Making a cable **strong** is more complex than it may seem. Things like strength member selection, denier, number of elements, picks per inch, **lay length**, to braid or contra-helically serve, are but some of the factors one must consider when designing a cable. Different uses may call for different designs. Putting an **optical fiber** in the middle of all those strength members only complicates things.

Talk with **Linden** about how to build a cable that works for you.

## Advantages

- Long continuous lengths
- Corrosion Resistant
- No hydrogen Darkening





## Singlemode

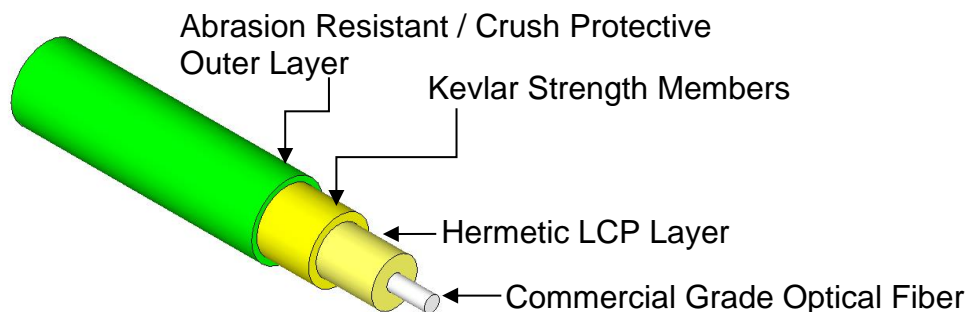
Spec No.	Part No.	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7052</a>	1-SM-A-27-O-45-Q-75	1.9	0.45	0.35	250	3.6
<a href="#">LINDEN-SPE-7050</a>	1-SM-A-27-O-55-Q-95	2.4	0.45	0.35	450	5.5
<a href="#">LINDEN-SPE-7282</a>	3-SM-A-35-B-38-T-95-Q-118	3.0	0.50	0.50	1,200	7.9
<a href="#">LINDEN-SPE-7171</a>	1-SM-J-35-O-45-Q-145	3.7	0.45	0.35	250	11
<a href="#">LINDEN-SPE-7097</a>	1-SM-A-27-O-82-Q-147	3.7	0.45	0.35	1,200	13
<a href="#">LINDEN-SPE-7114</a>	1-SM-A-27-O-67-GG-147	3.7	0.45	0.35	1,100	13.4
<a href="#">LINDEN-SPE-7300</a>	12-FO-U-114-O-134-Q-176	4.5	0.50	0.50	250	16
<a href="#">LINDEN-SPE-7457</a>	12-FO-GFLT-O-124-Q-184	4.7	0.45	0.35	250	18
<a href="#">LINDEN-SPE-7334</a>	1-SM-A-27-R-44-Z-146-Q-190	4.8	0.45	0.35	3,100	18.7
<a href="#">LINDEN-SPE-7473</a>	7264-O-138-Q-197	5.0	0.5	0.3	1,400	22
<a href="#">LINDEN-SPE-7398</a>	4-FO-O-170-Q-210	5.3	0.50	0.50	2,200	34
<a href="#">LINDEN-SPE-7407</a>	2-FO-V-63-O-96-Q-136-NN-151-Q-215	5.5	0.50	0.50	250	28
<a href="#">LINDEN-SPE-7404</a>	8-SM-U-114-O-134-Q-216	5.5	0.50	0.50	250	25
<a href="#">LINDEN-SPE-7312</a>	4-SM-V-102-T-142-Q-232	5.9	0.36	0.21	250	27
<a href="#">LINDEN-SPE-7429</a>	1-SM-V-102-O-115-Q-236	6.0	0.45	0.35	450	31
<a href="#">LINDEN-SPE-7322</a>	16-SM-T-240-Q-255	6.5	0.36	0.21	250	28
<a href="#">LINDEN-SPE-7383</a>	7098-T-236-Q-300	7.6	0.50	0.50	10,000	51
<a href="#">LINDEN-SPE-7082</a>	1-SM-A-27-B-30-O-47-L-108-O-170-Q-236	7.9	0.45	0.35	2,000	41
<a href="#">LINDEN-SPE-7371</a>	4-FO-P-136-O-236-Q-316	8.0	0.50	0.50	10,000	68
<a href="#">LINDEN-SPE-7312</a>	24-FO-O-270-Q-334	8.5	0.50	0.50	-	33
<a href="#">LINDEN-SPE-7289</a>	4-FO-X-140-O-308-OO-349	8.8	0.50	0.50	9,000	57
<a href="#">LINDEN-SPE-7256</a>	4-FO-P-136-O-193-FQ-393	10.0	0.50	0.50	5,000	80
<a href="#">LINDEN-SPE-7399</a>	24-SM-O-445-Q-475-NN-483-Q-523	13.3	0.45	0.35	3,200	120
<a href="#">LINDEN-SPE-7275</a>	4-FO-P-169-O-216-P-246-FQ-393	15.0	0.50	0.50	8,000	176

## Multimode (50/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1310nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7083</a>	1-F-A-27-O-47-Q-75	1.9	3.5	3.0	250	3.6
<a href="#">LINDEN-SPE-7084</a>	1-F-A-27-O-67-Q-95	2.4	3.5	3.0	450	5.5
<a href="#">LINDEN-SPE-7387</a>	2-FO-V-63-O-134-FQ-174	4.4	3.0	1.0	1,350	15
<a href="#">LINDEN-SPE-7396</a>	4-MM-V-102-T-142-Q-232	5.9	3.0	1.0	250	27
<a href="#">LINDEN-SPE-7388</a>	4-FO-V-102-O-157-FQ-236	6.0	3.0	1.0	1,200	19.5
<a href="#">LINDEN-SPE-7400</a>	24-MM-O-445-Q-475-NN-483-Q-523	13.3	3.0	1.0	3,200	120

## Multimode (62.5/125)

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1310nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7085</a>	1-I-A-27-O-47-Q-75	1.9	3.5	3.0	250	3.6
<a href="#">LINDEN-SPE-7086</a>	1-I-A-27-O-67-Q-95	2.4	3.5	3.0	450	5.5
<a href="#">LINDEN-SPE-7159</a>	1-I-J-35-O-45-Q-137	3.5	3.5	3.0	250	11
<a href="#">LINDEN-SPE-7268</a>	3-I-V-63-O-103-Q-190	4.8	2.9	1.0	1,200	20
<a href="#">LINDEN-SPE-7087</a>	1-I-A-27-L-160-T-230-Q-310	7.9	3.5	3.0	2,000	41



CONTACT LINDEN FOR  
MORE DETAILED  
SPECIFICATIONS OR  
CUSTOM REQUIREMENTS

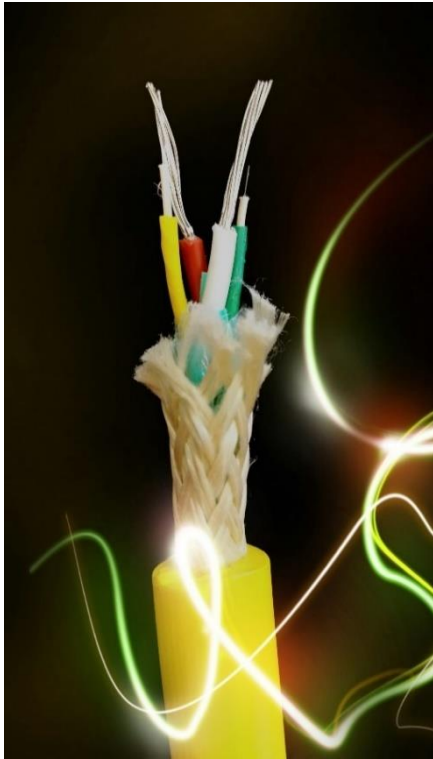


*Hybrid Cables*

**Rugged & Durable**

**Buoyant**

**Thin & Lightweight**



## Hybrid Cables

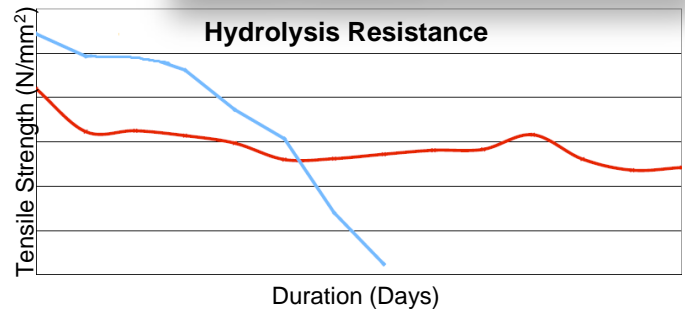
Linden Photonics **hybrid cables** combine copper and fiber elements in a **lightweight**, yet strong and robust tether cable. Linden can customize your size, buoyancy and strength; from **neutrally buoyant** designs to extremely thin cables with various conductor offerings and fiber types available. Linden's patented cable jacket construction is designed to protect delicate fibers in the harsh subsea environment. Linden's hybrid cables are compact and rugged; flexible and strong.

## Features

- Rugged, durable patented STFOC fiber optic elements
- Hermetic coating protects fiber from moisture
- Buoyant designs
- Thin wall insulation = thinner/lighter cables
- Fiber strength members = lighter cables
- Vectran strength members available offering less self-abrasion and longer service life
- 300V, 600V & 1,000V standard ratings

Our standard TPU is an **Ether grade** providing better hydrolysis performance in moisture rich environments.

**Ester grades** are available non-humid environments requiring improved abrasion resistance.



## Advantages

- Virtually crush proof
- Non-corrosive
- Thin, lightweight, yet strong
- Withstands high hydrostatic pressure
- Synthetic strength members for higher strength and lower weight

CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS



## Specifications

Spec No.	Part No.	OD (mm)	Fiber Type	Conductor	UTS (lbs)
<b>1 x Singlemode (SM)</b>					
<a href="#">LINDEN-SPE-7136</a>	1-FO-2-CU-BB-120-22759	3	1 x SM	2 x #22	N/A
<a href="#">LINDEN-SPE-7373</a>	1-FO-6-CU-O-11-Q-135	3.2	1 x SM	6 x #26	450
<a href="#">LINDEN-SPE-7148*</a>	1-FO-2-CU-O-10-FQ-146-YEL	3.7	1 x SM	2 x #28	450
<a href="#">LINDEN-SPE-7149*</a>	1-FO-2-CU-O-10-FQ-192-YEL	4.9	1 x SM	2 x #24	450
<a href="#">LINDEN-SPE-7218*</a>	1-FO-2-CU-O-10-FQ-192-YEL-95A	4.9	1 x SM	2 x #24	450
<a href="#">LINDEN-SPE-7221*</a>	1-FO-2-CU-O-10-FMM-192-YEL	4.9	1 x SM	2 x #24	450
<a href="#">LINDEN-SPE-7290</a>	1-FO-2-CU-O-171-FQ-211	5.4	1 x SM	2 x #16	250
<a href="#">LINDEN-SPE-7170</a>	1-FO-4-CU-S-138-O-168-L-228	5.8	1 x SM	4 x #22	450
<a href="#">LINDEN-SPE-7104</a>	1-FO-2-CU-O-155-Q-250	6.4	1 x SM	2 x #20	880
<a href="#">LINDEN-SPE-7161*</a>	1-FO-3-CU-O-150-FQ-250	6.35	1 x SM	1 x #20 (TP) & #28	1,600
<a href="#">LINDEN-SPE-7195*</a>	1-FO-2-CU-O-150-FQ-250	6.35	1 x SM	2 x #20	1,600
<a href="#">LINDEN-SPE-7326</a>	1-FO-3-CU-O-150-FQ-250-NN-295	7.5	1 x SM	2 x #20 & 1 x #28 DW	1,600
<a href="#">LINDEN-SPE-7481</a>	1-FO-8-CU-NN-200-O-205-Q-315	8.0	1 x SM	3 x #24 & 1 x #24 TP	300
<a href="#">LINDEN-SPE-7141*</a>	1-FO-8-CU-O-235-FQ-323	8.2	1 x SM	8 x #26	1,500
<a href="#">LINDEN-SPE-7248*</a>	1-FO-6-CU-O-197-FQ-338	8.6	1 x SM	2 x #20, 2 x #24 TP	200
<a href="#">LINDEN-SPE-7153*</a>	1-FO-2-CU-O-263-FQ-362	9.2	1 x SM	2 x #20 TP	1,600
<a href="#">LINDEN-SPE-7128*</a>	1-FO-2-CU-O-312-FQ-412	10.5	1 x SM	2 TP x #22	5,000
<a href="#">LINDEN-SPE-7386*</a>	1-FO-2-CU-X-288O-288-FQ-434	11.0	1 x SM	2 x #17 & 1 x #26 DW	1,200
<a href="#">LINDEN-SPE-7131*</a>	1-FO-5-CU-O-260-FQ-460	11.7	1 x SM	5 x #18	1,100
<a href="#">LINDEN-SPE-7110*</a>	1-FO-3-CU-Q-328-R-500	13	1 x SM	3 x #16	450
<a href="#">LINDEN-SPE-7480</a>	1-FO-12-CU-O-287-FQ-550	14	1 x SM	12 x #22	1,000
<a href="#">LINDEN-SPE-7194*</a>	1-FO-2-CU-O-420-FQ-1036	26.3	1 x SM	2 x #8	1,250
<b>2 x Singlemode (SM)</b>					
<a href="#">LINDEN-SPE-7277</a>	2-FO-2-CU-O-171-FQ-211	5.4	2 x SM	2 x #16	250
<a href="#">LINDEN-SPE-7152*</a>	2-FO-2-CU-O-155-Q-215	5.5	2 x SM	2 x #24	2,100
<a href="#">LINDEN-SPE-7345</a>	2-FO-2-CU-O-197-OO-260	5.5	2 x SM LT	2 x #16	2,400
<a href="#">LINDEN-SPE-7107*</a>	2-FO-2-CU-O-155-Q-235	6	2 x SM	2 x #24	2,100
<a href="#">LINDEN-SPE-7311</a>	2-FO-3-CU-O-173-Q-252	6.4	2 x SM	3 x #20	250
<a href="#">LINDEN-SPE-7189*</a>	2-FO-2-CU-O-150-FQ-278	7.1	2 x SM	1 x #20 TP & 1 x #28 DW	1,600
<a href="#">LINDEN-SPE-7327</a>	2-FO-3-CU-O-150-FQ-250-NN-295	7.9	2 x SM	1 x #20 TP & 1 x #28 DW	3,200
<a href="#">LINDEN-SPE-7120</a>	2-FO-3-CU-O-280-Q-320	8.1	2 x SM	3 x #22	5,500
<a href="#">LINDEN-SPE-7138*</a>	2-FO-2-CU-O-225-FQ-330	8.4	2 x SM	2 x #18	1,000
<a href="#">LINDEN-SPE-7164</a>	2-FO-2-CU-O-207-Q-337	8.6	2 x SM	2 x #20	2,400
<a href="#">LINDEN-SPE-7177</a>	2-FO-5-CU-O-246-Q-366	9.3	2 x SM LT	4 x #18 & 1 x #24 STP	1,760
<a href="#">LINDEN-SPE-7122</a>	2-FO-2-CU-O-155-Q-390	9.9	2 x SM	2 x #16	2,200
<a href="#">LINDEN-SPE-7355</a>	2-FO-2-CU-Q-138-O-320-B-390	9.9	2 x SM LT	2 x #24	16,000
<a href="#">LINDEN-SPE-7123</a>	2-FO-2-CU-T-320-Q-400	10.2	2 x SM	2 x #14	800
<a href="#">LINDEN-SPE-7468</a>	2-FO-3-CU-O-388-FQ-400	10.2	2 x SM LT	2 x #16 & 2 x #18	1,000
<a href="#">LINDEN-SPE-7103</a>	2-FO-2-CU-O-155-Q-420	10.7	2 x SM	4 x #13	1,300
<a href="#">LINDEN-SPE-7469*</a>	2-FO-3-CU-O-388-FQ-400-S-430	10.9	2 x SM LT	2 x #16 & 1 x #18	1,000
<a href="#">LINDEN-SPE-7293</a>	2-FO-2-CU-O-388-Q-448	11.4	2 x SM	2 x #12	4,000
<a href="#">LINDEN-SPE-7462</a>	2-FO-6-CU-O-352-Q-452	11.5	2 x SM LT	6 x #18	10,000
<a href="#">LINDEN-SPE-7227</a>	2-FO-6-CU-X-297-O-327-DD-470-ORN	12	2 x SM	4 x #16, 2 x #24 TP	5,000
<a href="#">LINDEN-SPE-7500*</a>	2-FO-5-CU-O-217-FQ-442-Q-472	12	2 x SM LT	4 x #20, 1 x #28 DW & 1 x #28 SW	1,600
<a href="#">LINDEN-SPE-7313</a>	2-FO-2-CU-Q-138-O-320-B-475	12.1	2 x SM	2 x #14	800
<a href="#">LINDEN-SPE-7178*</a>	2-FO-5-CU-O-246-M-405-Q-484	12.3	2 x SM LT	4 x #18, #24STP	1,760
<a href="#">LINDEN-SPE-7100*</a>	2-FO-2-CU-O-155-Q-500	12.7	2 x SM	2 x #14	2,100
<a href="#">LINDEN-SPE-7291</a>	2-FO-2-CU-NN-216-Z-422-S-530	13.5	2 x SM	2 x #16	12,000
<a href="#">LINDEN-SPE-7241*</a>	2-FO-4-CU-O-55-S-65-FQ-535-ORN	13.6	2 x SM	4 x #16	3,200
<a href="#">LINDEN-SPE-7106*</a>	2-FO-4-CU-O-155-Q-550	13.9	2 x SM	4 x #20	1,573
<a href="#">LINDEN-SPE-7109</a>	2-FO-5-CU-O-155-Q-550	13.9	2 x SM	5 x #16	15,400
<a href="#">LINDEN-SPE-7222</a>	2-FO-4-CU-S-280-O-450-S-550	14	2 x SM	4 x #20	11,000
<a href="#">LINDEN-SPE-7292</a>	2-FO-2-CU-JJ-415-Q-550	14	2 x SM	2 x #16	29,000
<a href="#">LINDEN-SPE-7125*</a>	2-FO-2-CU-Q-557	14.1	2 x SM	2 x #16	1,200
<a href="#">LINDEN-SPE-7465*</a>	1-FO-6-CU-O-273-FQ-530	14.6	2 x SM	6 x #18	2,000



Spec No.	Part No.	OD (mm)	Fiber Type	Conductor	UTS (lbs)
<a href="#">LINDEN-SPE-7228*</a>	2-FO-2-CU-365-FQ-585-YEL	14.9	2 x SM	2 x #16	2,200
<a href="#">LINDEN-SPE-7354</a>	2-FO-5-CU-Q-322-T-500-B-600	15.25	2 x SM LT	5 x #16	14,000
<a href="#">LINDEN-SPE-7501*</a>	2-FO-4-CU-NN-332-O-344-FQ-650	16.5	2 x SM	4 x #14	1,250
<a href="#">LINDEN-SPE-7233*</a>	2-FO-2-CU-O-397-FQ-617-YEL	15.7	2 x SM	2 x #16	2,600
<a href="#">LINDEN-SPE-7139</a>	2-FO-4-CU-S-377-T-525-GG-620	15.7	2 x SM	4 x #16	12,320
<a href="#">LINDEN-SPE-7276*</a>	2-FO-6-CU-X-358-O-398-FQ-628-YEL	16	2 x SM	4 x #18, 1 x #22 STP	3,200
<a href="#">LINDEN-SPE-7262*</a>	2-FO-6-CU-O-155-FQ-638-ORN	16.2	2 x SM (LT)	4 x #16, 2 x #24TP	5,000
<a href="#">LINDEN-SPE-7249*</a>	2-FO-5-CU-X-252-0282-FQ-674-ORN	17.11	2 x SM	4 x #16, 1 x #28 TP	3,200
<a href="#">LINDEN-SPE-7126</a>	2-FO-12-CU-T-535-FQ-709	18	2 x SM	2 x #14, 10 x #23 TP	3,600
<a href="#">LINDEN-SPE-7111*</a>	2-FO-3-CU-S-730	18.5	2 x SM(LT)	3 x #18	2,200
<a href="#">LINDEN-SPE-7252*</a>	2-FO-4-CU-M-496-O-536-FQ-800-ORN	20.3	2 x SM (LT)	4 x #18	2,300
<b>3 x Singlemode (SM)</b>					
<a href="#">LINDEN-SPE-7162*</a>	3-FO-1-CU-O-175-FQ-275	7	3 x SM	1 x #20 (TP)	1,600
<a href="#">LINDEN-SPE-7350</a>	3-FO-2-CU-O-164-L-275	7	3 x SM	2 x #24	450
<a href="#">LINDEN-SPE-7142*</a>	3-FO-2-CU-O-20-Q-367	9.3	3 x SM	2 x #14	1,500
<a href="#">LINDEN-SPE-7166</a>	3-FO-2-CU-O-325-Q-415-YEL	10.5	3 x SM	2 x #12	1,200
<a href="#">LINDEN-SPE-7160*</a>	3-FO-4-CU-O-322-FQ-475-Q-511-YEL	13	3 x SM	2 x #20	1,600
<a href="#">LINDEN-SPE-7395</a>	3-FO-3-CU-S-289-O-413-NN-443-B-540	13.7	3 x SM	3 x #20	14,000
<a href="#">LINDEN-SPE-7251</a>	3-FO-4-CU-O-585-Q-685	17.4	3 x SM	2 x #6, 2 x #9	3,500
<a href="#">LINDEN-SPE-7113</a>	3-FO-3-CU-O-630-DD-770	19.6	3 x SM	3 x #16	35,200
<a href="#">LINDEN-SPE-7237</a>	3-FO-7-CU-Q-590-O-760-Q-858-YEL	21.8	3 x SM	7 x #10	11,000
<a href="#">LINDEN-SPE-7231*</a>	3-FO-4-CU-O-764-FQ-923-BLK	23.4	3 x SM	3 x #11, 1 x #20 TP	15,500
<b>4 x Singlemode (SM)</b>					
<a href="#">LINDEN-SPE-7466</a>	1-FO-3-CU-PP-O-250-Q-310	7.9	4 x SM (LT)	3 x #14 & Coax	750
<a href="#">LINDEN-SPE-7391*</a>	4-FO-2-CU-O-208-FQ-350	8.9	4 x SM (LT)	2 x #16	1,100
<a href="#">LINDEN-SPE-7167</a>	4-FO-2-CU-O-327-Q-417-YEL	10.6	4 x SM	2 x #12	1,200
<a href="#">LINDEN-SPE-7206</a>	4-SM-10-CU-Q-439	11.2	4 x SM	10 x #18	-
<a href="#">LINDEN-SPE-7392*</a>	4-FO-2-CU-O-230-FQ-450	11.4	4 x SM (LT)	2 x #14	1,100
<a href="#">LINDEN-SPE-7124*</a>	4-FO-4-CU-O-55-S-65-FQ-470	11.93	4 x SM (LT)	2 x #18, 2 x #22, 2 x #24	3,200
<a href="#">LINDEN-SPE-7163</a>	4-FO-4-CU-O-55-FQ-457-ORN	11.6	4 x SM (LT)	2 x #18, 2 x #22, 2 x #24	3,200
<a href="#">LINDEN-SPE-7199*</a>	4-FO-4-CU-O-55-S-65-FQ-470	11.93	4 x SM (LT)	2 x #18, 2 x #22, 1 x #24	3,200
<a href="#">LINDEN-SPE-7363</a>	4-FO-4-CU-O-55-S-65-S-460	11.96	4 x SM (LT)	2 x #18, 2 x #22, 1 x #24	3,200
<a href="#">LINDEN-SPE-7102</a>	4-FO-4-CU-O-155-DD-470	12.0	4 x SM	4 x #16	5,500
<a href="#">LINDEN-SPE-7261*</a>	4-FO-6-CU-O-55-S-65-FQ-480-ORN	12.2	4 x SM (LT)	2 x #18, 2 x #22, 2 x #24	3,200
<a href="#">LINDEN-SPE-7151*</a>	4-FO-4-CU-S-287-O-387-FQ-547	13.9	4 x SM	4 x #20	5,500
<a href="#">LINDEN-SPE-7143</a>	4-FO-4-CU-S-280-O-450-S-550	14.0	4 x SM	4 x #20	11,000
<a href="#">LINDEN-SPE-7330*</a>	4-FO-6-CU-O-55-S-70-FQ-600	15.25	4 x SM (2 x LT)	4 x #19, 1 x 24, 1 x #22	5,000
<a href="#">LINDEN-SPE-7325</a>	4-FO-6-CU-O-55-S-75-MM-590	15.0	4 x SM (2 x LT)	4 x #19, 1 x #24, 1 x #22	6,000
<a href="#">LINDEN-SPE-7303</a>	4-FO-7-CU-O-350-FQ-610-YEL	15.5	4 x SM (LT)	7 x #18	4,800
<a href="#">LINDEN-SPE-7219*</a>	4-FO-6-CU-O-55-S-75-FQ-590-ORN	15.0	4 x SM(LT)	4 x #18, 1 x #22, 1 x #24	6,000
<a href="#">LINDEN-SPE-7101</a>	4-FO-4-CU-O-175-Q-650	16.5	4 x SM	4 x #16	23,100
<a href="#">LINDEN-SPE-7108*</a>	4-FO-8-CU-O-155-Q-910	23.1	4 x SM	8 x #18	15,400
<a href="#">LINDEN-SPE-7471</a>	4-FO-4-CU-S-787-W-890-S-1023	26	4 x SM	4 x #4	25,800
<b>5, 6, 8 &amp; 12 x Singlemode (SM)</b>					
<a href="#">LINDEN-SPE-7308</a>	5-FO-2-CU-Q-248	6.3	5 x SM	2 x #18	-
<a href="#">LINDEN-SPE-7250</a>	8-FO-4-CU-O-236-Q-332	8.43	8 x SM	4 x #16	450
<a href="#">LINDEN-SPE-7121</a>	12-FO-8-CU-Q-350	8.9	12 x SM	8 x #18	-
<a href="#">LINDEN-SPE-7255</a>	6-FO-6-CU-O-336-B-480-BLK	12.2	6 x SM	6 x #18	13,800
<a href="#">LINDEN-SPE-7348</a>	8-FO-2-CU-Q-223-O-583-Q-710	18.0	8 x SM (LT)	2 x #18	30,000
<a href="#">LINDEN-SPE-7349</a>	8-FO-2-CU-Z-786-S-930	23.6	8 x SM (LT)	2 x #6	21,500
<b>Singlemode (SM) &amp; Multimode (MM)</b>					
<a href="#">LINDEN-SPE-7333</a>	8-FO-4-CU-O-238-L-332	8.43	8 x MM	4 x #16	450
<a href="#">LINDEN-SPE-7295</a>	2-FO-3-CU-O-266-Q-326-ORN	8.3	2 x MM	3 x #18	250
<a href="#">LINDEN-SPE-7332</a>	8-FO-4-CU-Q-472-O-531-Q-610	15.5	4 x SM & 4 x MM	4 x #28	3,400
<a href="#">LINDEN-SPE-7127</a>	4-FO-6-CU-Q-410-Q-760	19.3	3xSM & 1xMM	6 x #20	15,400
<a href="#">LINDEN-SPE-7112*</a>	4-FO-4-CU-S-1210	30.7	2xSM + 2xMM	4 x #15	3,934

\*Denotes Buoyant Design

MANY MORE DESIGNS AVAILABLE – CONTACT US





***AVNOC***  
***Avionic Cable***  
**Simple Design**  
**Improved Performance**

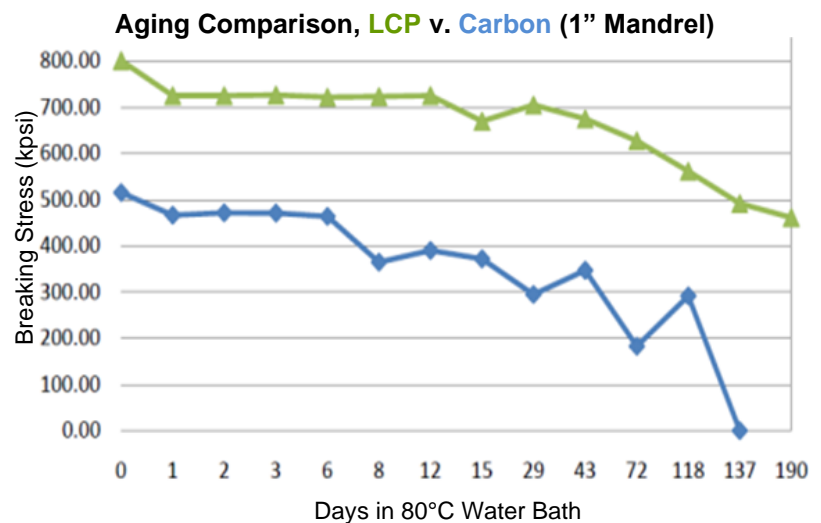
# AVNOC

Linden's avionic grade fiber optic cables are designed for the most rigorous avionic environment. AVNOC™ is built to survive the perils of aircraft confines such as high temperature, large temperature variations, high vibration and extreme flexing. Using our patented cable jacket construction designed to protect the fiber from harsh mechanical conditions; our cables are stronger, lighter and smaller than existing flight qualified cables.



## Features

- Meets AS5382
- Simple 3-layer extruded construction
- High temperature
- Lighter design
- Bend insensitive 9μm singlemode
- 50μm multimode version
- Eliminates need for carbon coated fiber



## Advantages

- No Kevlar
- Non-Wicking
- Crush Resistant
- Non-Kink
- Easier to terminate
- Better fatigue performance than carbon coated fibers

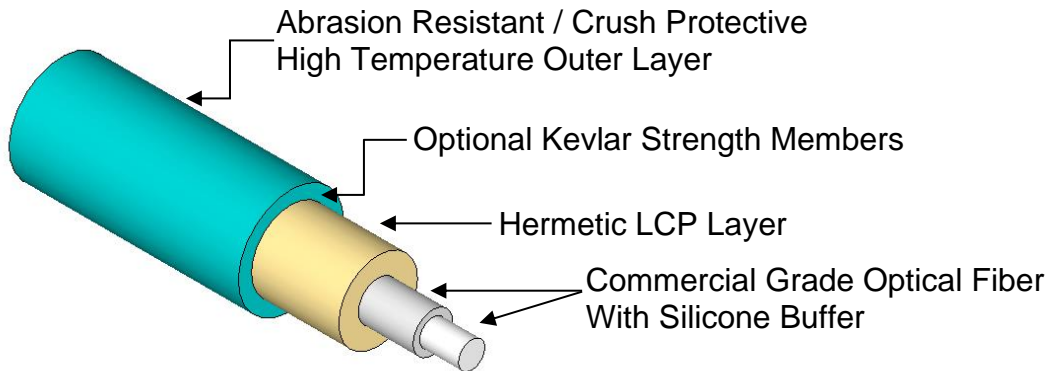


## Singlemode

Spec No.	Part No.	Fiber Type	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7033</a>	1-XX-A-27-M-66	SM Draka BendBright Elite HTA	1.7	1.5	1.4	45	3.1

## Multimode

Spec No.	Part No.	Fiber Type	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1310nm (dB/km)	Tensile Strength (lbs)	Weight (kg/km)
<a href="#">LINDEN-SPE-7041</a>	1-YY-A-27-M-66	Draka BendBright MaxCap OM3 HTA (50/125)	1.7	6	4	45	3.1



CONTACT LINDEN FOR MORE DETAILED SPECIFICATIONS OR CUSTOM REQUIREMENTS



***Radiation Hardened  
Optical Cable***

**Optical and Mechanical  
Performance to 20MRad**



## Radiation Hardened

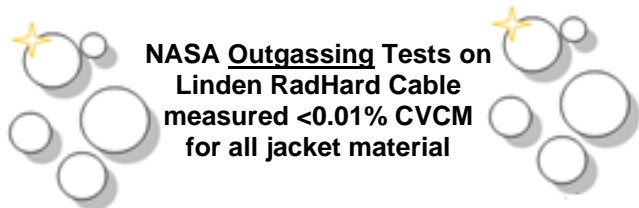
Linden's RadHard fiber optic cables provide a complete solution where a robust fiber optic link is needed in a harsh, high radiation environment. A wide variety of cable constructions are available to meet your specific requirements including our patented Non-Kink™ cable.

Tested as per European Space Agency - ESCC Basic Specification No. 2263010

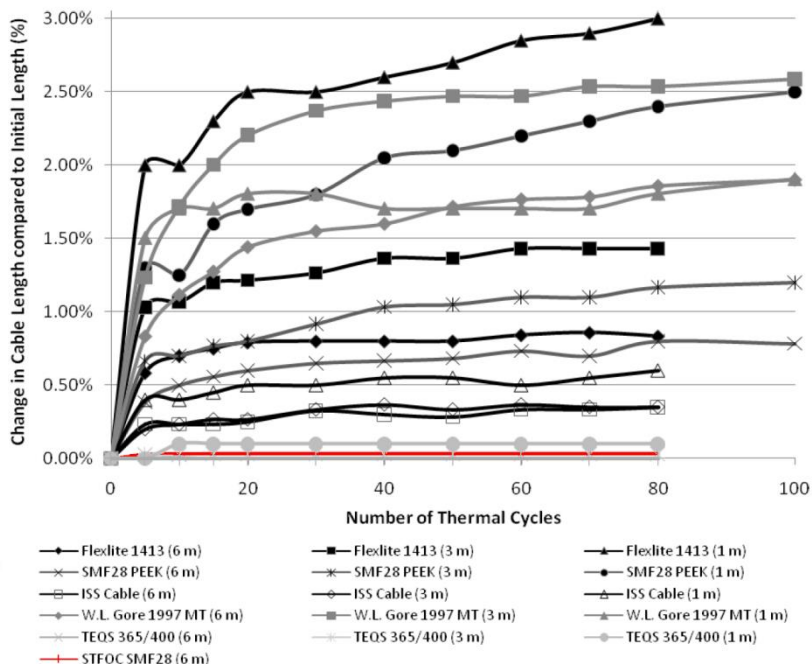


## Features

- Maintain optical and mechanical performance to >20MRad
- Tested to ESCC Spec No. 2263010
- Tested to NASA-STD-8739.5
- Tested to SAE AS5382
- No carbon layer needed



**NASA Outgassing Tests on Linden RadHard Cable measured <0.01% CVM for all jacket material**



## Advantages

- No Kevlar
- Thermally stable
- Preconditioning prevents jacket shrinkage
- Crush Resistant
- Non-Kink



## Singlemode

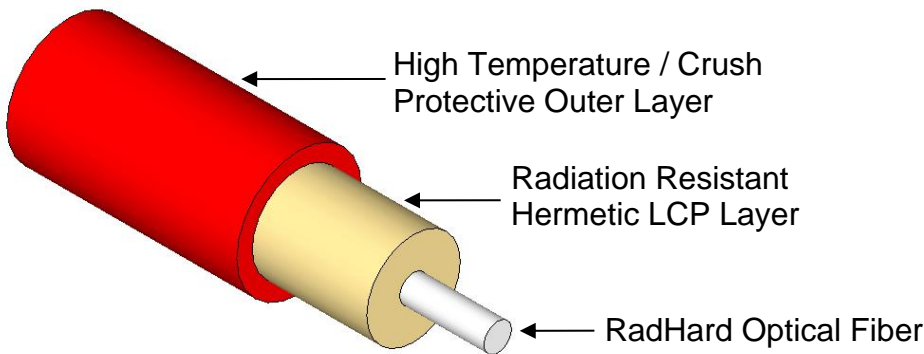
Spec No.	Part No.	Fiber Type	OD (mm)	Typical Connector Loss (dB)	Tensile Strength (lbs)
<a href="#">LINDEN-SPE-7079</a>	1-M-A-27-J-65-YEL	RadHard Singlemode	1.65	<0.2dB	50
<a href="#">LINDEN-SPE-7208</a>	1-M-A-27-J-79-YEL	RadHard Singlemode	2.0	<0.2dB	50
<a href="#">LINDEN-SPE-7209</a>	1-M-A-27-J-87-YEL	RadHard Singlemode	2.2	<0.2dB	50
<a href="#">LINDEN-SPE-7068</a>	1-EE-A-27-J-65	RadHard Polyimide	1.65	<0.2dB	45
<a href="#">LINDEN-SPE-7216</a>	1-EE-A-27-J-79	RadHard Polyimide	2.0	<0.2dB	45
<a href="#">LINDEN-SPE-7217</a>	1-EE-A-27-J-87	RadHard Polyimide	2.2	<0.2dB	45

## Multimode

Spec No.	Part No.	Fiber Type	OD (mm)	Typical Connector Loss (dB)	Tensile Strength (lbs)
<a href="#">LINDEN-SPE-7088</a>	1-N-A-27-J-35-ORN	RadHard MM (50/125)	.900	<0.2dB	50
<a href="#">LINDEN-SPE-7210</a>	1-N-A-27-J-65-ORN	RadHard MM (50/125)	1.65	<0.2dB	50
<a href="#">LINDEN-SPE-7211</a>	1-N-A-27-J-79-ORN	RadHard MM (50/125)	2.0	<0.2dB	50
<a href="#">LINDEN-SPE-7212</a>	1-N-A-27-J-87-ORN	RadHard MM (50/125)	2.2	<0.2dB	50
<a href="#">LINDEN-SPE-7081</a>	1-O-A-27-J-19-65	RadHard MM (62.5/125)	1.65	<0.2dB	50
<a href="#">LINDEN-SPE-7213</a>	1-O-A-27-J-79-ORN	RadHard MM (62.5/125)	2.0	<0.2dB	50
<a href="#">LINDEN-SPE-7214</a>	1-O-A-27-J-87-ORN	RadHard MM (62.5/125)	2.2	<0.2dB	50
<a href="#">LINDEN-SPE-7346</a>	12-SM-O-U-114	RadHard MM (50/125)	2.9	<0.2dB	60

## Singlemode & Multimode

Spec No.	Part No.	Fiber Type	OD (mm)	Typical Connector Loss (dB)	Tensile Strength (lbs)
<a href="#">LINDEN-SPE-7294</a>	4-FO-U-102-O-122-J-137	Two (2) RadHard SM + Two (2) x RadHard MM	3.5	<0.2dB	250



CONTACT LINDEN FOR MORE DETAILED SPECIFICATIONS OR CUSTOM REQUIREMENTS



# *Patchcords*

**SubSea**

**Avionic**

**Space**



# Patchcords

Harsh environment fiber optic patchcords for applications demanding high performance. Whether deep beneath the ocean surface where crush resistance and fish bite protection is imperative, near the surface where buoyancy is needed, in the air, or outer space, Linden keeps you connected. A combination of Linden's patented cable constructions and industry leading interconnect solutions provide a top-notch solution for your connectivity needs.



## Features

- Rugged, durable, patented STFOC™ fiber optic cables
- Hermetic coating protects fiber from moisture/hydrogen/helium
- Crush proof, non-kink cables
- Buoyant/Avionic/High Temperature/RadHard designs
- Thin wall insulation = thinner/lighter cables
- Various connector types available



## Applications

- Subsea
- Surface
- Avionic
- Space







# Ordering Information

AAAA-BBB-CCC-DD A = Cable / B = Connector 1 / C = Connector 2 / D = Length (m)

SubSea – Fiber Type		
7043	Non-Kink Singlemode 1.65mm	<a href="#">LINDEN-SPE-7043</a>
7196	Non-Kink Singlemode 2.00mm	<a href="#">LINDEN-SPE-7196</a>
7044	Non-Kink Multimode (50/125) 1.65mm	<a href="#">LINDEN-SPE-7044</a>
7197	Non-Kink Multimode (50/125) 2.00mm	<a href="#">LINDEN-SPE-7197</a>
7046	Non-Kink Multimode (62.5/125) 1.65mm	<a href="#">LINDEN-SPE-7046</a>
7198	Non-Kink Multimode (62.5/125) 2.00mm	<a href="#">LINDEN-SPE-7198</a>
SubSea - Buoyant – Cable Type		
7036	Buoyant High Strength Singlemode 1.9mm	<a href="#">LINDEN-SPE-7036</a>
7076	Buoyant High Strength Multimode (50/125) 1.9mm	<a href="#">LINDEN-SPE-7076</a>
7093	Buoyant High Strength Multimode (62.5/125) 1.9mm	<a href="#">LINDEN-SPE-7093</a>
7055	Buoyant High Strength Singlemode 3.5mm	<a href="#">LINDEN-SPE-7055</a>
7077	Buoyant High Strength Multimode (50/125) 3.5mm	<a href="#">LINDEN-SPE-7077</a>
7091	Buoyant High Strength Multimode (62.5/125) 3.5mm	<a href="#">LINDEN-SPE-7091</a>
7096	Buoyant Singlemode 900µm	<a href="#">LINDEN-SPE-7096</a>
7207	Buoyant Singlmode 1.10mm	<a href="#">LINDEN-SPE-7207</a>
Avionic – Cable Type		
7033	AVNOC Singlemode 1.6mm	<a href="#">LINDEN-SPE-7033</a>
7041	AVNOC Multimode (50/125) 1.6mm	<a href="#">LINDEN-SPE-7041</a>
Space – Cable Type		
7079	RadHard Singlemode 1.65mm	<a href="#">LINDEN-SPE-7079</a>
7208	RadHard Singlemode 2.00mm	<a href="#">LINDEN-SPE-7208</a>
7210	RadHard Multimode (50/125) 1.65mm	<a href="#">LINDEN-SPE-7210</a>
7211	RadHard Multimode (50/125) 2.00mm	<a href="#">LINDEN-SPE-7211</a>
7213	RadHard Multimode (62.5/125) 2.00mm	<a href="#">LINDEN-SPE-7213</a>
7214	RadHard Multimode (62.5/125) 2.20mm	<a href="#">LINDEN-SPE-7214</a>

## Connector Type

SubSea		Surface	
LF1	FC-DRY HP Singlemode	TF1	FC/PC
LF2	FC-DRY HP Multimode (50/125)	TF2	FC/APC
LF3	FC-DRY HP Multimode (62.5/125)	SC1	SC/PC
LS1	ST-DRY HP Singlemode	SC2	SC/APC
LS2	ST-DRY HP Multimode (50/125)	TS3	ST
LS3	ST-DRY HP Multimode (62.5/125)	TL1	LC/PC
FS1	Fischer F01 Singlemode	TL2	LC/APC
		MPO	Multi-Fiber Push-on
Avionic/Space – Connector Type			
AV1	Diamond AVIM Singlemode	SF1	Space Qualified FC/PC
AV2	Diamond AVIM Multimode	SF2	Space Qualified FC/APC

**\*\*Other Cable Types and Connectors available upon request\*\***



*Phase Stabilized STFOC*  
Cost Effective

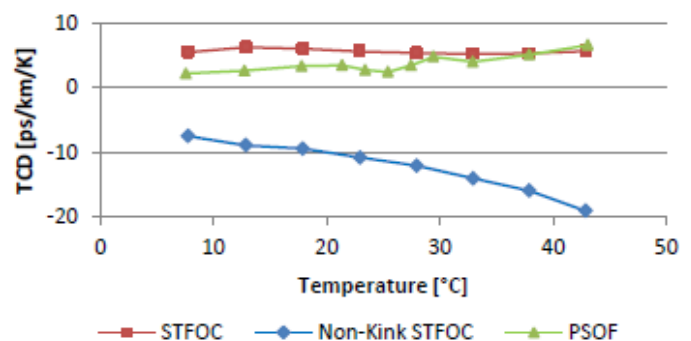
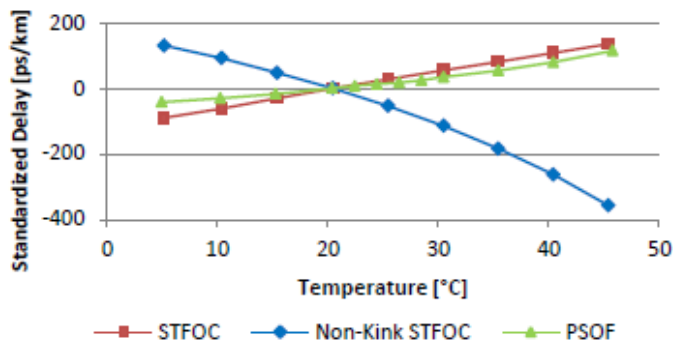


# Phase Stabilized STFOC

Phase Stabilized STFOC is a specialty fiber which minimizes the temperature dependence of transmission delay time. It is used for transmitting base band signals in synchronized measurement systems. The fiber is buffered with Linden Photonics' patented Liquid Crystal Polymer jacketing, a material with negative thermal expansion coefficient. Kevlar strength members are also available.

## Features

- Negative Thermal Coefficient of Delay (TCD) Available

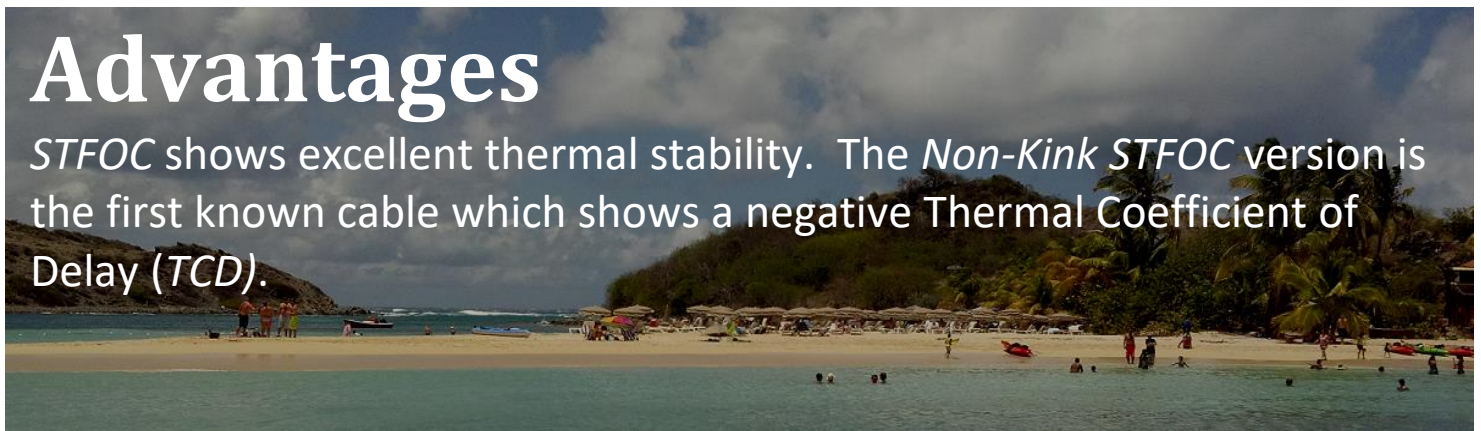


\*NEW PHASE STABLE OPTICAL FIBER, M. Bousonville, et al, 2012

(<http://accelconf.web.cern.ch/accelconf/BIW2012/papers/mopg033.pdf>)

## Advantages

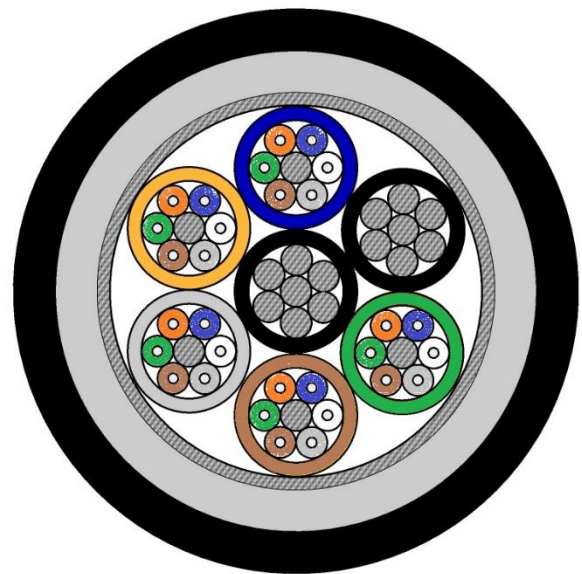
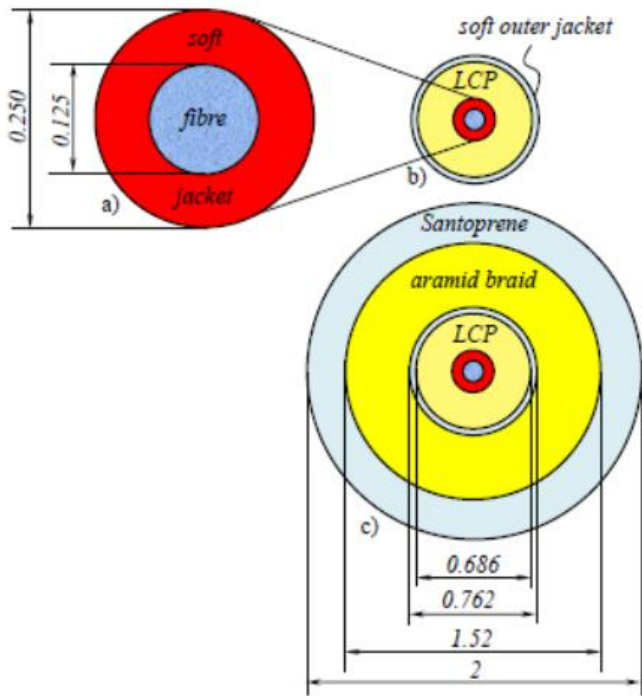
STFOC shows excellent thermal stability. The *Non-Kink STFOC* version is the first known cable which shows a negative Thermal Coefficient of Delay (TCD).





## Singlemode

Description	Specification No. Part No.	Fiber Type	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Tensile Strength (lbs)	TCD Value (ps/°C/km)
STFOC	<a href="#">LINDEN-SPE-7193</a> <a href="#">1-SM-A-27-B-30-TCD</a>	Singlemode	0.762	0.45	0.35	50	~ 10
Non-kink STFOC	<a href="#">LINDEN-SPE-7192</a> <a href="#">1-SM-A-27-O-47-L-75-</a> <a href="#">TCD</a>	Singlemode	1.9	0.45	0.35	250	~ -10



Multi-Channel Designs Available

\*NEW PHASE STABLE OPTICAL FIBER, M. Bousonville, et al, 2012  
(<http://accelconf.web.cern.ch/accelconf/BIW2012/papers/mopg033.pdf>)

CONTACT LINDEN FOR MORE DETAILED SPECIFICATIONS OR CUSTOM REQUIREMENTS



# ***Precision Wound Spools***

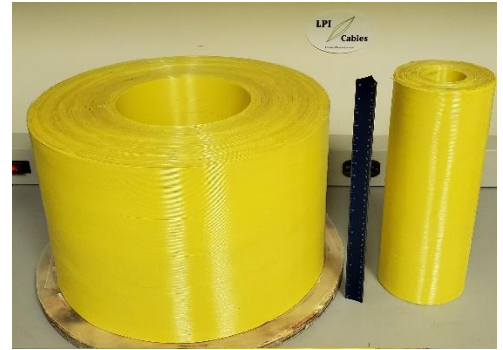
**Tangle Free**

**Internal Deployment**



## PRECISION WOUND PACKS

These precision-wound optical fiber packs are designed for use in such critical applications as submarine-launched buoys, underwater munitions and terrestrial robots to provide a capability for two-way, high-bandwidth communications.



Our standard spools are made from either Strong Tether Fiber Optic Cable (STFOC™), Buoyant STFOC™- or bare optical fiber. These spools are for slow, low tension payout or high-speed rapid payout. Fiber pays out from the inside of the spool so spool remains stationary during deployment. Precision packs can be designed with singlemode or can be modified with multimode fiber. Linden has delivered packs 30 km in length!

### EXAMPLE PACK SIZES - STFOC™ - BSTFOC™

Spool ID	Spool OD	Spool Length	Cable Length	P/N
2"	5"	12"	3.75km	7260-2-5-12
7"	13"	9.5"	20km	7260-7-13-9.5
7"	16"	9.5"	30km	7260-7-16-9.5

## Ordering Information

AAAA-BB-CC-DD A = Cable Type / B= ID (in.) / C = OD (in.) / D = Spool Length (in.)

### Custom Spools

In addition to our standard, cost efficient precision wound spools, we are able to leverage our quality team of engineers to design and build custom spools with specialty fiber or cable in custom sizes to meet your exacting requirements. Some of our custom design capabilities include;

- Externally deployable spools
- Buoyant cables
- High strength cables
- Specialty optics
- Custom Sizes
- Custom designed canisters



CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS

PRESSURE TESTING AND DEPLOYMENT TESTING AVAILABLE



# ***MicroTethers***

**Thin & Lightweight**

**Flexible**

**Power & Optics**

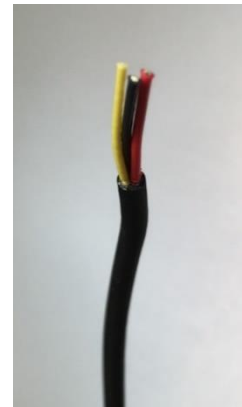


# MicroTethers

Expanding upon our well-known subsea cables, Linden Photonics introduces a line of **MicroTethers** to its product line. Typically small gauge copper and fiber elements are enclosed in a **lightweight** cable designed to provide power and communications to airborne drones or aerostats. Linden can customize your size, weight and strength; from **high-strength** designs intended to provide anchoring for large aerostats in high winds to extremely thin tethers designed for the smallest of drones. Linden's expertise in low density cable jacketing is ideal for this environment. Our cables are compact and rugged; flexible and strong.

## Features

- **Lightweight:** Designs from 0.007lbs/ft (10.4g/m)
- Designs from 100 to 13,000 lbs work load
- 3-channels in 2.9mm OD
- Designs with or without fiber
- Various power options
- MIL M22759 Tefzel coated wire – up to 1,000V rated
- Braided or extruded jackets



## Advantages

- Highly Flexible
- Thin, lightweight, yet strong
- Reduced cable weight = maximum payload capacity







## Specifications

Spec No.	Part No.	OD (mm)	Fiber Type	Conductor Type	Weight (lbs/1kft)
<b>Lightweight - Drones</b>					
<a href="#">LINDEN-SPE-7477</a>	2-CU-O-86-B-96	2.4	None	2 x 24 AWG	5.8
<a href="#">LINDEN-SPE-7479</a>	2-SM-O-70-BB-100	2.5	2 x Singlemode (LINDEN-SPE-7283)	None	3.33
<a href="#">LINDEN-SPE-7441</a>	1-FO-2-CU-EE-105	2.7	1 x LINDEN-SPE-7096	2 x 24 AWG	7.0
<a href="#">LINDEN-SPE-7459</a>	1-FO-2-CU-EE-116	2.95	1 x LINDEN-SPE-7069	2 x 24 AWG	8.5
<a href="#">LINDEN-SPE-7140</a>	1-FO-2-CU-BB-115-22759	2.9	1 x LINDEN-SPE-7096	2 x 22 AWG	7.0
<a href="#">LINDEN-SPE-7156</a>	1-FO-2-CU-BB-115	2.9	1 x LINDEN-SPE-7034	2 x 24 AWG	6.0
<a href="#">LINDEN-SPE-7440</a>	1-FO-4-CU-BB-115	2.9	1 x LINDEN-SPE-7096	2 x 24 AWG & 2 x 28 AWG	9.0
<a href="#">LINDEN-SPE-7157</a>	1-FO-2-CU-BB-120-22759	3.0	1 x LINDEN-SPE-7043	2 x 22 AWG	8.5
<a href="#">LINDEN-SPE-7158</a>	1-FO-2-CU-EE-120-22759-24	3.0	1 x LINDEN-SPE-7096	2 x 24 AWG	8.5
<a href="#">LINDEN-SPE-7423</a>	2-FO-2-CU-Z-120	3.0	2 x LINDEN-SPE-7034	2 x 22 AWG	9.2
<a href="#">LINDEN-SPE-7437</a>	1-FO-2-CU-BB-120	3.0	1 x LINDEN-SPE-7096	2 x 20 AWG	13.2
<a href="#">LINDEN-SPE-7493</a>	1-I-2-CU-Q-120)	3.0	1 x Multimode (62.5um)	2 x 24 AWG	8.5
<a href="#">LINDEN-SPE-7406</a>	2-CU-BB-122-22	3.1	None	2 x 22 AWG	9.0
<a href="#">LINDEN-SPE-7382</a>	2-CU-BB-122-20	3.1	None	2 x 20 AWG	13.5
<a href="#">LINDEN-SPE-7185</a>	1-FO-3-CU-O-116-BB-125-22759	3.2	1 x LINDEN-SPE-7096	2 x 22 AWG & 1 x 26 AWG	8.25
<a href="#">LINDEN-SPE-7497</a>	1-I-2-CU-EE-126	3.2	1 x Multimode (62.5um)	2 x 22 AWG	11
<a href="#">LINDEN-SPE-7186</a>	1-FO-3-CU-O-R-116-BB-125-22759	3.2	1 x LINDEN-SPE-7096	2 x 22 AWG & 1 x 26 AWG	9.1
<a href="#">LINDEN-SPE-7187</a>	1-FO-3-CU-O-120-BB-130-22759	3.3	1 x LINDEN-SPE-7096	2 x 20 AWG & 1 x 26 AWG	12.0
<a href="#">LINDEN-SPE-7215</a>	1-FO-3-CU-O-125-BB-130-22759M	3.3	1 x LINDEN-SPE-7096	2 x 20 AWG & 1 x 26 AWG	9.5
<a href="#">LINDEN-SPE-7381</a>	1-FO-4-CU-O-130	3.3	1 x LINDEN-SPE-7096	2 x 20 AWG & 2 x 28 AWG	14.7
<a href="#">LINDEN-SPE-7397</a>	3-CU-PP-110-Q-130	3.3	None	2 x 20 AWG & 1 x 28 AWG	12.5
<a href="#">LINDEN-SPE-7258</a>	1-FO-3-CU-BB-133	3.4	1 x LINDEN-SPE-7096	2 x 20 AWG & 1 x 26 AWG	12.8
<a href="#">LINDEN-SPE-7352</a>	1-FO-2-CU-O-100-Q-140	3.5	1 x LINDEN-SPE-7096	2 x 24 AWG	8.4
<a href="#">LINDEN-SPE-7337</a>	4-CU-O-120-R-140	3.6	None	2 x 24 AWG & 2 x 28 AWG	12
<a href="#">LINDEN-SPE-7474</a>	2-FO-2-CU-EE-140	3.6	2 x LINDEN-SPE-7034	2 x 22 AWG	11.8
<a href="#">LINDEN-SPE-7335</a>	1-FO-4-CU-BB-1245	3.7	1 x LINDEN-SPE-7034	4 x 24 AWG	10
<a href="#">LINDEN-SPE-7287</a>	2-CU-BB-145	3.7	None	2 x 22 AWG TP	10
<a href="#">LINDEN-SPE-7486</a>	2-CU-BB-146	3.7	None	2 x 18 AWG	13
<a href="#">LINDEN-SPE-7336</a>	1-FO-4-CU-EE-150-22759-24	3.8	1 x LINDEN-SPE-7096	4 x 24 AWG	12.7
<a href="#">LINDEN-SPE-7421</a>	2-FO-2-CU-BB-149	3.8	2 x LINDEN-SPE-7034	2 x 16 AWG	22.4
<a href="#">LINDEN-SPE-7436</a>	1-FO-2-CU-BB-147	3.8	1 x LINDEN-SPE-7096	2 x 16 AWG	21.5
<a href="#">LINDEN-SPE-7438</a>	2-CU-BB-147	3.8	None	2 x 16 AWG	21.4
<a href="#">LINDEN-SPE-7439</a>	1-FO-4-CU-BB-153	3.9	1 x LINDEN-SPE-7096	2 x 16 AWG	30.0
<a href="#">LINDEN-SPE-7343</a>	4-CU-BB-160	4.0	None	2 x 22 AWG & 2 x 26 AWG	10.5
<a href="#">LINDEN-SPE-7155</a>	1-FO-2-CU-BB-160-22759	4.1	1 x LINDEN-SPE-7096	2 x 20 AWG	12
<a href="#">LINDEN-SPE-7183</a>	2-FO-2-CU-BB-160-22759	4.1	2 x LINDEN-SPE-7096	2 x 20 AWG	12
<a href="#">LINDEN-SPE-7259</a>	1-FO-3-CU-EE-164	4.2	1 x LINDEN-SPE-7096	2 x 20 AWG & 1 x 26 AWG	18.8
<a href="#">LINDEN-SPE-7315</a>	1-FO-4-CU-O-143-R-163	4.2	1 x LINDEN-SPE-7034	2 x 20 AWG & 2 x 28 AWG	16
<a href="#">LINDEN-SPE-7340</a>	2-CU-BB-165	4.2	None	2 x 18 AWG TP	17.5
<a href="#">LINDEN-SPE-7443</a>	2-FO-4-CU-BB-165	4.2	2 x LINDEN-SPE-7096	2 x 22 AWG & 1 x 22 AWG TP	18.5
<a href="#">LINDEN-SPE-7188</a>	6-CU-Q-168	4.3	None	4 x 26 AWG + 2 x 28 AWG	15
<a href="#">LINDEN-SPE-7358</a>	1-FO-2-CU-BB-170-22759	4.3	1 x LINDEN-SPE-7207	2 x 18 AWG	14.5
<a href="#">LINDEN-SPE-7269</a>	2-CU-EE-174	4.4	None	2 x 24 AWG	10.7
<a href="#">LINDEN-SPE-7181</a>	2-FO-2-CU-EE-180-22759-24	4.6	2 x LINDEN-SPE-7034	2 x 24 AWG	7.0
<a href="#">LINDEN-SPE-7380</a>	2-CU-NN-143-R-183	4.6	None	2 x 20 AWG	16
<a href="#">LINDEN-SPE-7353</a>	1-FO-2-CU-O-137-Q-187	4.75	1 x LINDEN-SPE-7096	2 x 20 AWG	17.5

CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS



## Specifications

Spec No.	Part No.	OD (mm)	Fiber Type	Conductor Type	Weight (lbs/1kft)
<b>Heavy Duty - Aerostat</b>					
<a href="#">LINDEN-SPE-7278</a>	4-CU-T-181-OO-197	5.0	None	4 x 22 AWG	20.0
<a href="#">LINDEN-SPE-7338</a>	2-SM-2-CU-O-185-BB-205	5.2	1 x LINDEN-SPE-7283	2 x 18 AWG	22.5
<a href="#">LINDEN-SPE-7472</a>	4-SM-2-CU-O-185-BB-205	5.2	4 x Singlemode 2 x LINDEN-SPE-7283	2 x 18 AWG	23.6
<a href="#">LINDEN-SPE-7402</a>	1-FO-2-CU-O-220	5.6	1 X LINDEN-SPE-7096	2 x 14 AWG	34.0
<a href="#">LINDEN-SPE-7496</a>	4-FO-2-CU-O-192-BB-222	5.6	2 x Singlemode 1 x LINDEN-SPE-7283	2 x 18 AWG	24
<a href="#">LINDEN-SPE-7444</a>	6-FO-2-CU-T-167-U-227	5.75	6 x Singlemode	2 x 20 AWG	25
<a href="#">LINDEN-SPE-7502</a>	8-FO-2-CU-O-197-BB-227	5.8	8 x Singlemode (LINDEN-SPE-7267)	2 x 18 AWG	25.5
<a href="#">LINDEN-SPE-7270</a>	2-CU-EE-253	6.4	None	2 x 24 AWG	12.7
<a href="#">LINDEN-SPE-7174</a>	1-FO-3-CU-O-174-Q-254	6.5	1 x LINDEN-SPE-7034	2 x 24 AWG & 1 x 26 AWG	25
<a href="#">LINDEN-SPE-7179</a>	1-FO-3-CU-S-130-O-174-Q-254	6.5	1 x LINDEN-SPE-7034	2 x 24 AWG & 1 x 26 AWG	25
<a href="#">LINDEN-SPE-7232</a>	2-FO-3-CU-S-130-O-191-Q-257	6.5	2 x LINDEN-SPE-7034	2 x 24 AWG & 1 x 26 AWG	27
<a href="#">LINDEN-SPE-7279</a>	6-CU-T-300-OO-316	8.0	None	3 x 24 STP & 3 x 24 TRPL	52
<a href="#">LINDEN-SPE-7499</a>	4-FO-2-CU-O-265-B-315	8.0	4 x Singlemode 2 x LINDEN-SPE-7283	2 x 24 AWG	38
<a href="#">LINDEN-SPE-7426</a>	2-FO-2-CU-O-229-FQ-329	8.35	1 x LINDEN-SPE-7283	2 x 20 AWG	37
<a href="#">LINDEN-SPE-7454</a>	4-CU-O-270-S-330	8.4	None	2 x 22 AWG STP	74
<a href="#">LINDEN-SPE-7342</a>	2-CU-O-270-S-330	8.4	None	2 x 12 AWG	67
<a href="#">LINDEN-SPE-7452</a>	1-FO-2-CU-O-270-S-330	8.4	1 x LINDEN-SPE-7260	2 x 12 AWG	100
<a href="#">LINDEN-SPE-7488</a>	6-CU-O-276-EE-336	8.5	None	2 x 12 AWG & 2 x 22 AWG TP	73
<a href="#">LINDEN-SPE-7453</a>	1-FO-2-CU-O-280-S-340	8.6	4 x LINDEN-SPE-7260	2 x 12 AWG	69
<a href="#">LINDEN-SPE-7289</a>	4-FO-P-140-O-308-OO-349	8.8	4 x LINDEN-SPE-7096	None	57
<a href="#">LINDEN-SPE-7482</a>	1-FO-2-CU-O-289-EE-349	8.9	1 x LINDEN-SPE-7098	2 x 12 AWG	72
<a href="#">LINDEN-SPE-7314</a>	2-FO-4-CU-O-320-U-390-BLK	9.9	2 x LINDEN-SPE-7043	4 x 22 AWG	60
<a href="#">LINDEN-SPE-7475</a>	4-CU-P-237-O-390-B-470	12.0	None	2 x 22 AWG TP	104
<a href="#">LINDEN-SPE-7323</a>	2-FO-2-CU-S-122-T-425-00-465	12.4	1 x LINDEN-SPE-7283	2 x 20 AWG	65
<a href="#">LINDEN-SPE-7476</a>	1-FO-4-CU-P-270-O-411-B-491	12.5	2 x Singlemode 1 x LINDEN-SPE-7265	2 x 16 AWG TP	109
<a href="#">LINDEN-SPE-7341</a>	2-FO-2-CU-NN-216-T-422-B-520	13.2	1 X LINDEN-SPE-7283	2 x 16 AWG	94
<a href="#">LINDEN-SPE-7109</a>	2-FO-5-CU-O-155-Q-550	13.9	2 x LINDEN-SPE-7034	5 x 16 AWG	138

CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS



*Gel-Filled Loose Tube*

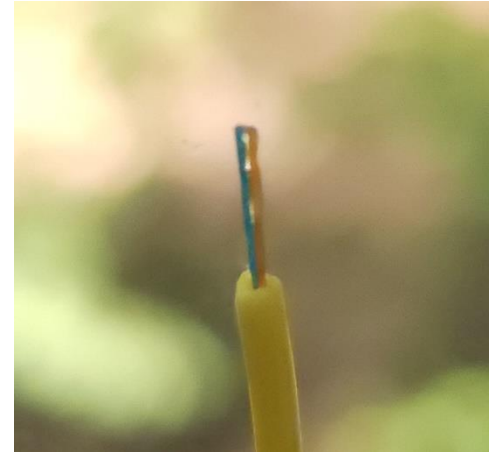
**1 to 12 Channels**

**Lightweight & Flexible**



# Gel Filled Loose Tube

Some hybrid cable designs benefit from isolating the fiber optics from large conductors and other elements that may crush the fiber and induce attenuation. In these cases, traditionally a fiber in a metal tube, or FIMT, is used. FIMT is heavy, stiff and expensive. Polymer loose tubes offer the protection and isolation of the internal fibers, but provide a lightweight, flexible and cost-effective alternative to FIMT. A robust, field proven, package for your vital communication link.



## Features

- Sizes range from 1.6mm to 3mm OD
- 1-channel to 12-channel designs available
- Singlemode, multimode or a combination of both.
- Thixotropic gel filled
- Dry tubes also available
- Long continuous lengths >3km available
- Color coded fibers and/or jacketing

## Advantages

- Highly Flexible
- Thin, lightweight, yet strong
- Custom design services available





## Singlemode

Spec No.	Part No.	OD (mm)	Attenuation @ 1310nm (dB/km)	Attenuation @ 1550nm (dB/km)	Fiber Type	Weight (kg/km)
<a href="#">LINDEN-SPE-7283</a>	2-SM-V-63	1.6	0.35	0.25	Two (2) x Singlemode	1.64
<a href="#">LINDEN-SPE-7265</a>	2-SM-V-102	2.6	0.35	0.25	Two (2) x Singlemode	5.09
<a href="#">LINDEN-SPE-7264</a>	4-SM-V-102	2.6	0.35	0.25	Four (4) x Singlemode	5.09
<a href="#">LINDEN-SPE-7267</a>	8-SM-U-114	2.9	0.35	0.25	Eight (8) x Singlemode	5.9
<a href="#">LINDEN-SPE-7299</a>	12-SM-U-114	2.9	0.45	0.40	Twelve (12) x Singlemode	5.9
<a href="#">LINDEN-SPE-7266</a>	5-SM-I-118	3.0	0.40	0.30	Fiver (5) x Singlemode	5.7
<a href="#">LINDEN-SPE-7271*</a>	4-SM-V-102-O-217-FQ-265	6.7	0.45	0.35	Four (4) x Singlemode	1.035 S.G

## Multimode

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm (dB/km)	Attenuation @ 1300nm (dB/km)	Fiber Type	Weight (kg/km)
<a href="#">LINDEN-SPE-7389</a>	2-F-V-63	1.6	3.0	1.0	Two (2) x 50µm	1.64
<a href="#">LINDEN-SPE-7284</a>	2-I-V-63	1.6	3.0	0.6	Two (2) x 62.5µm	1.64
<a href="#">LINDEN-SPE-7445</a>	1-F-J-36-TT-70	1.8	3.0	1.0	One (1) x 50µm	2.00
<a href="#">LINDEN-SPE-7390</a>	4-F-V-102	2.6	3.0	1.0	Four (4) x 50µm	5.09

## Singlemode & Multimode

Spec No.	Part No.	OD (mm)	Attenuation @ 850nm/1300nm (dB/km)	Attenuation @ 1310nm/1550nm (dB/km)	Fiber Type	Weight (kg/km)
<a href="#">LINDEN-SPE-7357</a>	2-SM-2-MM-V-102	2.6	3.0/1.0	0.35/0.25	Two (2) x Singlemode & Two (2) x 50µm	5.09

\*Denotes Buoyant Design

CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS



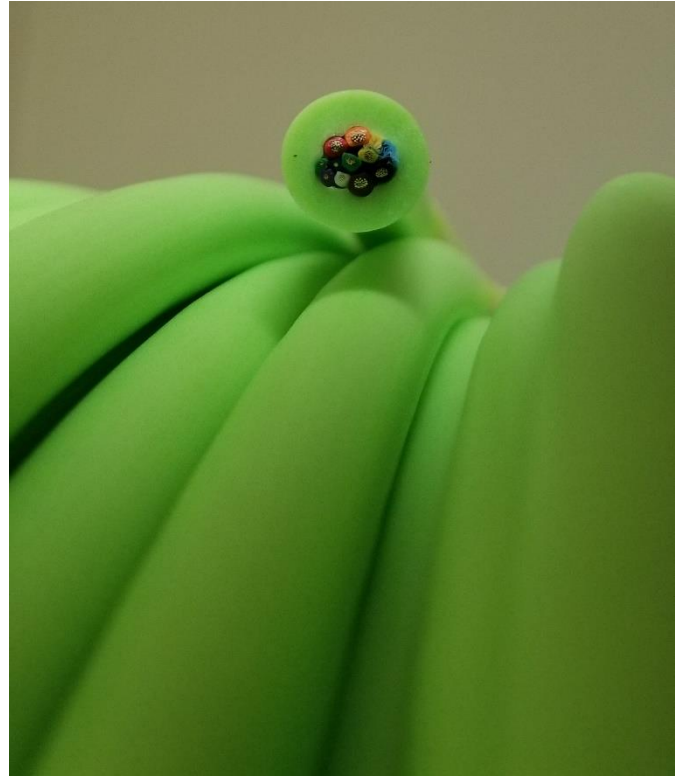
***Specialty Copper***  
**Buoyant Designs**  
**Built to Last**





# Specialty Copper

Using the technology we developed building more difficult fiber optic and hybrid cables, Linden Photonics now applies that materials and design knowledge to our line of specialty copper cables. Using specialty materials that make a cable light, temperature resistant, radiation hardened or **buoyant**, we draw from our years of expertise in specialty markets such as subsea, space and other harsh environments in between. Linden can customize your size, weight and strength; from **high-strength** designs to complex configurations incorporating mil-spec conductors. Our cables are compact and rugged; flexible and strong!



## Features

- **Wide Range of Size Capabilities:** from 3mm to >20mm OD
- Designs from 100 to 5,000 lbs work load
- Twisted Pairs / Shielded Twisted Pairs
- High Voltage
- Various insulation options
- MIL M22759 Tefzel coated wire – up to 1,000V rated
- Braided or extruded jackets



## Advantages

- Highly Flexible
- Thin, lightweight, yet strong
- Custom design services available





## Buoyant

Spec No.	Part No.	OD (mm)	Conductor Type	Tensile Strength (lbs)	Density (s.g.) nominal
<a href="#">LINDEN-SPE-7302</a>	2-CU-O-100-L-140-ORN	3.5	2 x 28 AWG	250	1.0
<a href="#">LINDEN-SPE-7360</a>	2-CU-O-100-L-150	3.8	2 x 26 AWG	250	1.0
<a href="#">LINDEN-SPE-7296</a>	2-CU-O-100-L-153-ORN	3.9	2 x 26 AWG	250	1.0
<a href="#">LINDEN-SPE-7165</a>	2-CU-O-62-FQ-156-YEL	4.0	1 x 26 AWG TP	100	0.99
<a href="#">LINDEN-SPE-7359</a>	2-CU-NN-O-100-L-160	4.0	2 x 26 AWG	250	1.0
<a href="#">LINDEN-SPE-7135</a>	2-CU-O-80-FQ-164	4.15	2 x 28 AWG	300	0.98
<a href="#">LINDEN-SPE-7244</a>	2-CU-O-80-FQ-164-Q-170	4.3	2 x 28 AWG	300	0.98
<a href="#">LINDEN-SPE-7133</a>	2-CU-FQ-182	4.6	2 x 26 AWG	300	1.0
<a href="#">LINDEN-SPE-7246</a>	2-CU-O-80-Q-100-FQ-170-Q-190	4.8	2 x 28 AWG	300	0.98
<a href="#">LINDEN-SPE-7247</a>	2-CU-O-80-Q-100-FQ-170-Q-190-NWB	4.8	2 x 28 AWG	300	0.98
<a href="#">LINDEN-SPE-7224</a>	2-CU-O-110-FQ-210-YEL	5.3	2 x 24 AWG STP + 1 x 26 AWG DW	400	1.029
<a href="#">LINDEN-SPE-7425</a>	4-CU-O-163-FQ-218	5.5	2 x 28 AWG TP	750	0.99
<a href="#">LINDEN-SPE-7433</a>	2-CU-O-102-L-150	3.8	2 x 26 AWG	150	0.98
<a href="#">LINDEN-SPE-7460</a>	2-CU-O-110-FQ-215	5.5	2 x 24 AWG STP 1 x 26 AWG DW	800	1.05
<a href="#">LINDEN-SPE-7145</a>	5-CU-O-20-FQ-248	6.3	5 x 26 AWG	1,500	1.0
<a href="#">LINDEN-SPE-7424</a>	2-CU-O-110-X-275-YEL	7.0	2 x 24 AWG STP & 1 x 26 AWG DW	400	1.025
<a href="#">LINDEN-SPE-7492</a>	2-CU-O-110-FQ-275-YEL	7.0	2 x 24 AWG STP; 1 x 26 AWG DW	800	1.05
<a href="#">LINDEN-SPE-7370</a>	4-FO-O-200-FQ-295	7.5	2 x 22 AWG + 2 x 26 AWG TP	450	1.03
<a href="#">LINDEN-SPE-7431</a>	4-CU-O-189-FQ-299	7.6	4 x 26 AWG TP	300	1.0
<a href="#">LINDEN-SPE-7301</a>	2-CU-O-200-FQ-300-BLK	7.6	2 x 20 AWG	6,667	1.02
<a href="#">LINDEN-SPE-7328</a>	4-FO-O-177-FQ-315	8.0	2 x 24 AWG STP + 1 x 26 AWG DW	300	1.025
<a href="#">LINDEN-SPE-7243</a>	4-CU-O-150-FQ-320-YEL	8.1	4 x 24 TP	300	1.03
<a href="#">LINDEN-SPE-7117</a>	2-CU-O-283-Q-360	9.2	2 x 20 AWG	1,500	1.0
<a href="#">LINDEN-SPE-7147</a>	3-CU-O-20-FQ-360-GRA	9.1	1 x 20 AWG TP; 2 x 20 AWG	1,500	1.0
<a href="#">LINDEN-SPE-7118</a>	2-CU-O-283-Q-363	9.2	2 x 20 AWG	3,000	1.03
<a href="#">LINDEN-SPE-7298</a>	2-CU-O-236-FQ-365-YEL	9.3	2 x 18 AWG	10,000	1.02
<a href="#">LINDEN-SPE-7379</a>	4-CU-O-252-FQ-393	10.0	2 x 18 AWG + 1 x 22 STP + 1 x 22 AWG DW	1,000	1.03
<a href="#">LINDEN-SPE-7432</a>	4-CU-O-227-FQ-407-YEL	10.3	2 x 18 AWG & 1 x 22 AWG TP & 1 x 22 AWG	1,000	1.03
<a href="#">LINDEN-SPE-7172</a>	10-CU-O-260-FQ-420	10.7	4 x 20 AWG; 1 x 24 AWG TP; 2 x 28 AWG TP	200	1.0
<a href="#">LINDEN-SPE-7190</a>	8-CU-O-260-FQ-420	10.7	4 x 20 AWG; 1 x 24 AWG TP; 1 x 24 AWG TP	200	1.02
<a href="#">LINDEN-SPE-7254</a>	5-CU-O-310-FQ-420	10.7	2 x 18 AWG; 2 x 22 STP; 1 x 22 AWG	1,000	1.03
<a href="#">LINDEN-SPE-7225</a>	4-CU-O-316-FQ-422-YEL	10.7	1 x 18 AWG STP + 1 x 24 WG STP	400	1.025
<a href="#">LINDEN-SPE-7173</a>	3-CU-O-240-FQ-350-Q-430	10.9	1x20 AWG TP; 1x28 AWG TP; 1x24 AWG TP	1,200	0.98





<a href="#">LINDEN-SPE-7463</a>	5-CU-O-245-FQ-450	11.5	2 x 16 AWG; 2 x 22 AWG STP; 1 x 22 AWG	2,000	1.03
<a href="#">LINDEN-SPE-7119</a>	5-CU-Q-562	14.3	2 x 16 AWG; 1 x 22 AWG; 1 x 24 AWG	2,400	1.0
<a href="#">LINDEN-SPE-7184</a>	20-CU-CAT6-O-336-FQ-566	14.4	20 x 24 AWG + CAT6	200	0.96
<a href="#">LINDEN-SPE-7175</a>	19-CU-CAT6-O-336-FQ-586	14.9	19 x 24 AWG + CAT6	200	0.98
<a href="#">LINDEN-SPE-7176</a>	7-CU-T-287-X-523-Q-602	15.3	3 x #16, 1 x #18, 1 x #24TP, 1 x #24, Coax	1,100	1.03

## Non-Buoyant

Spec No.	Part No.	OD (mm)	Conductor Type	Tensile Strength (lbs)
<a href="#">LINDEN-SPE-7306</a>	2-CU-HH-110	2.8	2 x 20 AWG	N/A
<a href="#">LINDEN-SPE-7134</a>	2-CU-O-80-FQ-120	3.0	2 x 28 AWG	100
<a href="#">LINDEN-SPE-7236</a>	1-CO-O-130-Q-150-YEL	3.81	1 x 28 (Coax)	300
<a href="#">LINDEN-SPE-7144</a>	2-CU-I-157	4.0	2 x 30 AWG	800
<a href="#">LINDEN-SPE-7242</a>	1-CU-FQ-160-YEL	4.0	1 x 26 AWG TP	300
<a href="#">LINDEN-SPE-7451</a>	2-CU-O-97-Q-157	4.0	2 x 26 AWG	600
<a href="#">LINDEN-SPE-7235</a>	2-CU-O-138-Q-153-YEL	3.88	2 x 22 AWG TP	300
<a href="#">LINDEN-SPE-7434</a>	3-CU-Q-177	4.5	3 x 22 AWG	N/A
<a href="#">LINDEN-SPE-7489</a>	4-CU-O-177-Q-232	5.9	4 x 24 AWG	300
<a href="#">LINDEN-SPE-7356</a>	3-CU-O-200-S-230	6.0	3 x 16 AWG	250
<a href="#">LINDEN-SPE-7115</a>	2-CU-O-161-Q-241	6.1	2 x 26 AWG	1,800
<a href="#">LINDEN-SPE-7116</a>	2-CU-O-175-Q-40-255	6.5	2 x 26 AWG	2,200
<a href="#">LINDEN-SPE-7285</a>	3-CU-O-230-S-260	6.6	2 x 26 AWG + 3 X 14 AWG	250
<a href="#">LINDEN-SPE-7378</a>	6-CU-O-214-Q-264	6.7	3 x 26 AWG TP	250
<a href="#">LINDEN-SPE-7447</a>	2-CU-AA-O-242-Q-294	7.5	2 x 16 AWG	250
<a href="#">LINDEN-SPE-7428</a>	2-CU-AA-O-242-Q-300)	7.6	2 x 14 AWG	250
<a href="#">LINDEN-SPE-7448</a>	4-CU-PP-O-250-Q-310	7.9	3 x 14 AWG + Mini Coax	750
<a href="#">LINDEN-SPE-7243</a>	4-CU-O-150-FQ-320-YEL	8.1	4 x 24 TP	300
<a href="#">LINDEN-SPE-7393</a>	3-CU-AA-O-260-Q-325	8.3	3 x 14 AWG	250
<a href="#">LINDEN-SPE-7105</a>	4-CU-O-155-Q-340	8.6	4 x 22 AWG	440
<a href="#">LINDEN-SPE-7220</a>	3-CU-O-279-U-350-BLK	8.86	2 x 22 AWG + 1 x 22 AWG TP	5,000
<a href="#">LINDEN-SPE-7230</a>	4-CU-O-283-S-359-YEL	9.1	4 x 24 AWG STP	1,200
<a href="#">LINDEN-SPE-7339</a>	4-CU-O-238-FQ-400	10.2	2 x 16 AWG + 2 x 24 TP	880
<a href="#">LINDEN-SPE-7168</a>	12-CU-O-324-Q-414-YEL	10.5	4 x 24 AWG; 2 x 18 AWG; 6 x 20 AWG	1,200
<a href="#">LINDEN-SPE-7239</a>	18-CU-CAT6-Q-420	10.7	18 x 24 AWG + Cat 6	200
<a href="#">LINDEN-SPE-7240</a>	7-CU-M-266-O-320-FQ-420-ORN	10.7	4 x 16 AWG + 3 x 24 AWG TP	2,500
<a href="#">LINDEN-SPE-7238</a>	O-90-5-CU-FQ-425-ORN	10.8	4 x 22 AWG + 1 x 26 AWG TP	1,000
<a href="#">LINDEN-SPE-7169</a>	6-CU-O-381-Q-461	11.7	2 x 16 AWG; 3 x 22 AWG TP; 1 x 20	200
<a href="#">LINDEN-SPE-7257</a>	4-CU-O-390-Q-490-BLK	12.45	4 x 18 AWG	13,500
<a href="#">LINDEN-SPE-7419</a>	10-CU-HH-221-O-435-Q-515	13	6 x 20 AWG; 4 x 24 AWG TP	450
<a href="#">LINDEN-SPE-7245</a>	4-CU-O-362-FQ-451-YEL	13.5	4 x 20 WG TP	1,200
<a href="#">LINDEN-SPE-7369</a>	4-FO-O-354-FQ-550	14	2 x 16 AWG + 2 x 22 AWG TP	4,400
<a href="#">LINDEN-SPE-7410</a>	8-CU-P-206-O-283-FQ-590	15	1 x 18 AWG STP; 3 x 22 AWG STP	6,000

\*TP=Twisted Pair; STP=Shielded Twisted Pair; DW=Drain Wire

### CONTACT LINDEN FOR DRAWINGS, SPECIFICATIONS OR CUSTOM REQUIREMENTS

# Cable Basics 101

**Minimum Bend Radius (MBR):** This is the most common question we receive about our cables and one with a complicated answer. MBR is always application and environment dependent and can vary with cable type too. Some cables can be tied in a knot and others (k)not so much. Is the cable a multi element cable? Is it under load? Is it in use? A good Rule of Thumb is  $MBR = 20 \times \text{Cable O.D.}$

**Safe Working Load (SWL):** Our cables are rated to an Ultimate Tensile Strength (UTS), which is the maximum load it will support (for a short time) before it physically breaks. Like MBR, SWL is application and environment dependent. For more complicated hybrid cables with optics it is best to operate between 15% and 20% of the rated UTS. A cable strengthened with torque balanced aramid fibers brought to 50% UTS may see up to 3% elongation.

**Optical Loss:** Optical fibers transmit data along their length in the form of light, usually at wavelengths of 850nm, 1310nm or 1550nm. As the light bounces down the core of the fiber inevitably some of the photons escape into the cladding and are lost. This loss is measured in Decibels (dB) and can be as low as 0.25 dB/km for some singlemode fibers and as much as 4 dB/km for multimode fibers. Higher loss limits effective working length.

**Lay Length:** Cables with multiple elements are twisted down the length of the cable. This is done to increase flexibility and protect these elements from being over strained. The Lay Length is the linear distance for one full twist. A shorter lay length yields a more flexible cable, but changes some characteristics related to weight size and performance. For cables with optics, the effective MBR must be considered to mitigate Optical Loss.

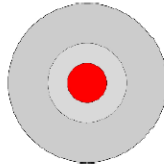
**Waterproofing:** There are several methods of moisture protection ranging from tape wrap, gel filling, metal tube enclosure. Optical fibers can be made hermetic by carbon deposition or LCP jacketing. LCP has been shown to be better than carbon in terms of moisture protection and it also allows for low cost, fast manufacturing.

**Conductors:** Conductors come in many shapes and sizes, but the most common is stranded, tin-plated copper. We use the American Wire Gauge (AWG) system (conversion to mm<sup>2</sup> on the next page). Generally, the larger the wire (smaller the gauge) the larger its current carrying capacity. The gauge number refers to the number of drawing processes the wire must go through to reach its size, hence the inverse relationship between gauge size and OD. Interestingly for gauges 5 through 14, the gauge is the number for wires that will fit side-by-side in one inch.

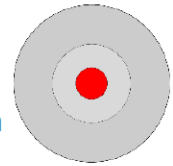
# Fiber Basics 101

## Common Fiber Types:

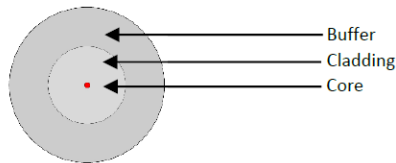
Multimode 62.5/125/250  
Larger core = larger power budget  
Typical maximum length <300 m



Multimode 50/125/250  
Higher Bandwidth than 62.5  
Typical maximum length <1km



Singlemode  
Small core = Very high bandwidth  
Typical maximum length 50,000m



**dB Loss to Power Ratio Conversion**

dB (loss)	Power ratio
0	1.000
0.1	0.977
0.2	0.955
0.3	0.933
0.4	0.912
0.5	0.891
0.6	0.871
0.7	0.851
0.8	0.832
0.9	0.813
1	0.794
2	0.631
3	0.501
4	0.398
5	0.316
6	0.251
7	0.200
8	0.158
9	0.126
10	0.1
20	0.01
30	0.001
40	0.0001
50	0.00001
60	0.000

# Wire Charts

## AWG to mm<sup>2</sup> Conversion

#AWG	Diameter (in)	Diameter (mm)	Cross Sectional Area (mm <sup>2</sup> )
1	0.289	7.35	42.4
2	0.258	6.54	33.6
4	0.204	5.19	21.1
6	0.162	4.11	13.3
8	0.129	3.26	8.36
10	0.102	2.59	5.26
12	0.0808	2.05	3.31
14	0.0641	1.63	2.08
16	0.0508	1.29	1.31
18	0.0403	1.02	0.82
20	0.032	0.81	0.52
22	0.0254	0.65	0.33
24	0.0201	0.51	0.2
26	0.0159	0.4	0.13
28	0.0126	0.32	0.081
30	0.0984	0.25	0.051
32	0.0787	0.2	0.035

## Wire Weight and Resistance

AWG Size	Strands / Strand Size	Approximate Weight		Maximum DC Resistance	
		lbs/ 1000 ft	Kg/Km	Ohms/1000 ft	Ohms/Km
34	7/42	0.136	0.2	265	869
34	19/46	0.147	0.22	247	809
32	7/40	0.21	0.31	170	556
32	19/44	0.237	0.35	156	511
30	7/38	0.349	0.52	100	329
30	19/42	0.37	0.55	97.6	320
28	7/36	0.546	0.81	63.6	209
28	19/40	0.569	0.85	62.5	205
26	7/34	0.866	1.3	39.7	130
26	19/38	0.947	1.4	37	121
24	7/32	1.4	2.1	24.5	80.2
24	19/36	1.48	2.2	23.4	76.8
22	7/30	2.18	3.3	15.6	51.1
22	19/34	2.35	3.5	14.6	48
20	7/28	3.32	5.2	9.77	32
20	19/32	3.79	5.6	9.01	29.6
18	7/26	5.52	8.2	6.19	20.3
18	19/30	5.92	8.8	5.74	18.8
16	7/24	8.82	13.1	3.85	12.6
16	19/29	7.56	11.3	4.48	14.7
14	7/22	11.9	17.7	3.15	10.03
14	19/27	11.9	17.8	2.83	9.28

# Cable Definitions

**Ampere** — Amount of current that flows when one volt is applied across one ohm of resistance. One ampere (A) is produced by one coulomb of charge passing a point in one second.

**Attenuation** — The decrease in magnitude of a signal as it travels through any medium. It is usually expressed in decibels (dB). See power conversion chart above.

**Braid Angle** — The angle between a strand of wire in a braid shield and the longitudinal axis (i.e. axis along the length of the center) of the cable it is wound around. Also expressed in picks per inch (ppi).

**Current Carrying Capacity** — The maximum current a conductor can carry without being heated beyond a safe limit. Ampacity.

**Impedance** — The effective resistance of an electric circuit or component to alternating current, arising from the combined effects of ohmic resistance and reactance.

**Ohm** — The unit of electrical resistance. The value of resistance through which a potential difference of one volt will maintain a current of one ampere.

**Ohm's Law** — Stated  $V=IR$ ,  $I=V/R$  or  $R=V/I$ . The current  $I$  in a circuit is directly proportional to the voltage  $V$ , and inversely proportional to the resistance  $R$ .

**Power** — The amount of work per unit of time; Watts. Power equals the product of voltage and current ( $P = V \times I$ ).

**Resistance** — In DC circuits, the opposition a material offers to current flow, measured in ohms. In AC circuits, resistance is the real component of impedance, and may be higher than the value measured at DC.

**Shield** — A tape, serve or braid placed around or between electric circuits or cables or their components, to prevent signal leakage or interference.

**Voltage** — also called electromotive force, is a quantitative expression of the potential difference in charge between two points in an electrical field.

**Voltage Drop** — The voltage developed across a component or conductor by the current flow through the resistance or impedance of the component or conductor.

**Voltage Rating** — The highest voltage that may be continuously applied to a cable construction in conformance with standards or specifications.



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