

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	REV	DESCRIPTION	DATE	APPROVED
09-2916184	RHN				
09-2816185	RHN				

EXPORT CONTROL WARNING – DO NOT DISCLOSE OR PROVIDE THIS DOCUMENT OR ITEM (INCLUDING ITS CONTENTS) TO NON-U.S. CITIZENS OR NON-U.S. PERMANENT RESIDENTS, OR TRANSMIT THIS DOCUMENT OR ITEM (INCLUDING ITS CONTENTS) OUTSIDE THE UNITED STATES WITHOUT THE WRITTEN PERMISSION OF GENERAL DYNAMICS AND REQUIRED U.S. GOVERNMENT EXPORT APPROVALS.

SPECIFICATION CONTROL DRAWING

ALL SHEETS OF THIS DRAWING MAINTAINED AT SAME REVISION	CONTRACT NO. W15P7T-07-D-K001		<b>GENERAL DYNAMICS</b> C4 Systems Taunton, MA 02780-1069			
	DWN B. SAVERY	DATE 10-05-04	PLENUM FIBER OPTIC CABLE			
	CHK J. MEZZANOTTE	DATE 10-05-04	MULTISTRAND SUBGROUPING			
	APVD W. BENSON	DATE 10-05-04	SIZE A	CAGE CODE 67032	DWG NO. 19-2816080	REV -
	APVD R. JOHNSTON	DATE 10-05-04	SCALE NONE	SOURCE MS WORD 7.0	SHEET 1 OF 9	

1. Item: This drawing describes two types of plenum rated fiber optic Indoor/Outdoor cable.
  - One with 8 subgroups of 12 fibers (96 fibers) multimode 62.5/125um color coded 900um diameter tight-buffer.
  - One with 3 subgroups of 12 fibers (36 fibers) multimode 62.5/125um color coded 900um diameter tight-buffer
2. Data Source: Per Optical Cable Corporation webpage (<http://www.occfiber.com>) (sheet 3 thru 9 herein)
3. Marking: The exterior cable jacket shall be permanently marked with the following Information (or as specified on the Purchase Order).
  - Sequential foot markers at two foot intervals. Each manufacturer's lot shall start at zero.
  - The manufacturer's normal marking is desired, with preference for manufacturer's name and part number or type. Other information is acceptable, space permitting.

4. Procuring Activity Part Number (see P/N below):

Procuring Activity P/N	Vendor and Vendor Part Number		
	OCC	Mohawk	General Cables
19-2816080-1	GX096KWLS9OP	M9B623T	CG0961A1D.BK
19-2816080-2	GX036KWLS9OP	M9B614T	CG0361A1D.BK

- Each reel shall be one length of cable with no splices. Length tolerance is -0+5%
- The Purchase Order must state the marking requirements and the quantity and length of reels

5. Suggested Source(s) of Supply

Optical Cable Corporation  
Roanoke, VA 24022

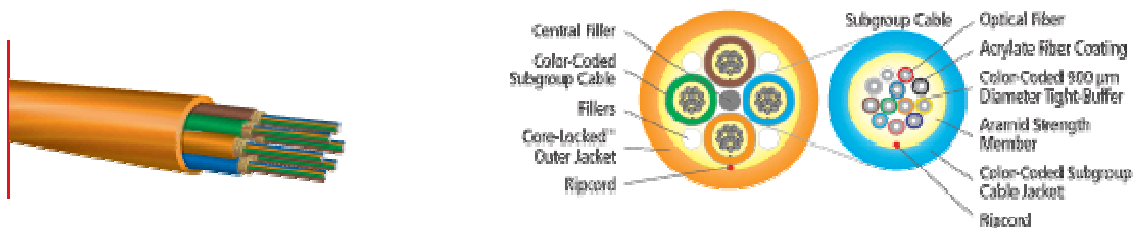
Mohawk Cable  
Leominster, MA 01453

General Cables  
Highland Heights, KY 41076

## Products

### G-Series Subgrouping Plenum Cables

[Applications and Features](#) | [General Characteristics](#)  
[Standards List](#) | [Specifications](#)



## Applications and Features

- Applications:
  - Used in trunking, LAN and distribution applications where versatile installation capability is required for ducts, plenums, and air handling spaces
  - Design allows subcables to be routed to multiple locations such as wiring racks and closets
  - Suitable for both indoor plenum and outdoor installation - no need to splice outdoor cable to indoor cable at the building entrance
- Features:
  - High performance components and construction
  - UL Listed in accordance with NEC sections 770.179(a) for use in ducts, plenums and air-handling spaces
  - Cable materials are indoor/outdoor – UV, water and fungus resistant
  - Wide operating temperature range of -40°C to +85°C
  - Helically stranded core for greater flexibility and mechanical protection of the optical fibers
  - Multifiber color-coded subcables, each similar to the D-Series Distribution cable, are easy to identify for improved cable management during installation
  - Best design for multimode and single-mode fiber hybrid cables
  - Available with 6-fiber (4.5mm) or 12-fiber (5.5mm) sub-groups
  - Jacket highly chemical resistant for installation in harsh industrial environments
  - Interlocking armor can be applied to cable as an alternative to conduit installation

### General Characteristics

	Plenum	
Operating Temperature	-40°C to +85°C	
Storage Temperature	-40°C to +85°C	
Installation Temperature (cable temp.)	0°C to +60°C	
Flame Retardancy	UL Listed Type OFNP (ANSI/NFPA 262) and FT6 (CSA C22.2 No. 232)	
Crush Resistance	2,100 N/cm	
Impact Resistance	1,500 impacts	
Flex Resistance	2,000 cycles	

*These specifications are subject to change without prior notification.*

### Standards List

Optical Cable Corporation indoor/outdoor tight buffered fiber optic cables meet the functional requirements of the following standards:

- GR-409-CORE
- ICEA-S-104-696
- ICEA-S-83-596
- TIA-568
- TIA-598

**Specifications****6-Fiber**

Fiber Count	Part Number <i>Previous Part Number</i>	Diameter mm (in)	Weight kg/km (lbs/1,000)	Tensile Load		Minimum Bend Radius	
				Installation N (lbs)	Operational N (lbs)	Installation cm (in)	Long Term cm (in)
12	GB012K- 9R GX12- 145D- /900-OFNR	14.1 (0.56)	217.0 (146.0)	3800 (850)	1200 (270)	21.2 (8.3)	21.2 (8.3)
18	GB018K- 9P GX18- 125K- /900-OFNP	14.1 (0.56)	211.0 (142.0)	4700 (1060)	1500 (340)	21.2 (8.3)	21.2 (8.3)
24	GB024K- 9P GX24- 125K- /900-OFNP	14.1 (0.56)	206.0 (138.0)	5600 (1260)	1800 (400)	21.2 (8.3)	21.2 (8.3)
30	GB030K- 9P GX30- 135K- /900-OFNP	14.7 (0.58)	243.0 (163.0)	7500 (1690)	2400 (540)	22.1 (8.7)	22.1 (8.7)
36	GB036K- 9P GX36- 150K- /900-OFNP	16.1 (0.63)	262.0 (176.0)	8900 (2000)	2850 (640)	24.2 (9.5)	24.2 (9.5)

## 12-Fiber

Fiber Count	Part Number <i>Previous Part Number</i>	Diameter mm (in)	Weight kg/km (lbs/1,000)	Tensile Load		Minimum Bend Radius	
				Installation N (lbs)	Operational N (lbs)	Installation cm (in)	Long Term cm (in)
24	GX024K-9P	15.4	273.0	4600	1500	23.2	23.2
	GX24-140K- /900-OFNP	(0.61)	(183.0)	(1030)	(340)	(9.1)	(9.1)
36	GX036K-9P	15.4	263.0	5900	1950	23.2	23.2
	GX36-140K- /900-OFNP	(0.61)	(177.0)	(1330)	(440)	(9.1)	(9.1)
48	GX048K-9P	15.4	254.0	7200	2400	23.2	23.2
	GX48-140K- /900-OFNP	(0.61)	(170.0)	(1620)	(540)	(9.1)	(9.1)
60	GX060K-9P	16.9	293.0	9500	3150	25.4	25.4
	GX60-160K- /900-OFNP	(0.67)	(197.0)	(2140)	(710)	(10.0)	(10.0)
72	GX072K-9P	18.4	317.0	11300	3750	27.6	27.6
	GX72-175K- /900-OFNP	(0.72)	(213.0)	(2540)	(840)	(10.9)	(10.9)

Installation loads in excess of 2,700 N (600 lbs) are not recommended.  
Other fiber counts available upon request.

### Outer Cable Jacket Materials

The table below is provided as a general reference guide for the properties and typical applications for the common jacket materials used in certain OCC fiber optic cable products. Please refer to the Product Specifications sections within this catalog for the various cable types and fiber counts available with the various jacket materials, or call OCC Sales to discuss your specific application requirements.

#### Cable Jacket Material Reference Guide

	Indoor/Outdoor					Indoor		Outdoor						
	Flame Retardant PVC	Low Temperature Oil Resistant PVC	Fluoro-polymer Plenum	Flexible Fluoro-polymer Plenum	Low Smoke Zero Halogen	Flame Retardant Plenum	Flexible PVC	Medium Density Poly-ethylene	Flame Retardant Poly-urethane	Hard Poly-urethane	Poly-olefin	Poly-urethane	Low Smoke Zero Halogen Poly-urethane	Flame Retardant Tactical Poly-urethane
Material Code	D	J	K	W	Z	S	N	A	E	R	X	C	G	V
Duct Installation	■	■	■	■	■	■	■	■			■			
Fungus Resistant	■	■	■	■	■	■	■	■	■	■	■	■	■	■
UV Resistant	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Water Resistant	■	■	■	■	■		■	■	■	■	■	■	■	■
Direct Burial	■		■	■	■			■						
Aerial	■	■		■	■			■	■	■	■	■	■	■
High Flex Life				■					■	■	■	■	■	■
Soft, Flexible						■	■		■			■		■
Tight Bends	■	■					■		■		■	■	■	■
Low Friction	■	■	■	■				■		■				
Minimum Operating Temp (°C)	-40	-40	-40	-40	-40	-20	-40	-40	-55	-55	-55	-55	-55	-55
Maximum Operating Temp (°C)	+85	+85	+85	+85	+70	+70	+85	+70	+85	+85	+85	+85	+85	+85
Petro-chemical Resistance	■	■	■	■	■			■		■	■	■	■	■
Severe Chemical Environments			■	■				■				■		■

**SUBGROUPING FIBER OPTIC CABLE  
TYPE OFNP PLENUM PRODUCT SPECIFICATION**

**INDOOR/OUTDOOR CABLES**

**Laser Ultra-Fox™ Fiber Performance**

Fiber Code	Core/Cladding Diameter (µm)	Wavelength (nm)	Industry Standard Designation	Gigabit Ethernet Distance (m)	10-Gigabit Ethernet Distance (m)	Maximum Cabled Attenuation (dB/km)	Minimum Laser Bandwidth (MHz-km)	Minimum LED Bandwidth* (MHz-km)
WLS	62.5/125 Standard	(850/1310)	OM1 ISO/IEC 11801	300/600	33/300 <sup>1</sup>	3.5/1.5	220/500	200/500
WLX	62.5/125 XL	(850/1310)	OM1 ISO/IEC 11801	500/1000	33/300 <sup>1</sup>	3.0/1.0	385/500	200/500
ALS	50/125 Standard	(850/1310)	OM2 ISO/IEC 11801	600/600	82/300 <sup>2</sup>	3.5/1.5	510/500	500/500
ALX	50/125 XL	(850/1310)	OM2 ISO/IEC 11801	750/600	150/300 <sup>2</sup>	3.0/1.0 <sup>3</sup>	950/500	700/500
ALT	50/125 (300 meter 10-GbE)	(850/1310)	(OM3 ISO/IEC 11801	1000/600	300/300 <sup>2</sup>	3.0/1.0 <sup>3</sup>	2000/500	1500/500
ALE	50/125 (550 meter 10-GbE)	(850/1310)	OM3 ISO/IEC 11801	1040/600	550/300 <sup>2</sup>	3.0/1.0 <sup>3</sup>	4700/500	3500/500
SLX	9 <sub>6</sub> /125 Low Water Peak Single-mode	1310/1550	ITU-T G.652.D	5 km <sup>4</sup>	10 km <sup>5</sup>	0.5/0.5	—	—
SLA	9 <sub>6</sub> /125 Bend-Insensitive Single-mode	(1310/1550)	ITU-T G.657.A ITU-T G.652.D	5 km <sup>4</sup>	10 km <sup>5</sup>	0.5/0.5	—	—
SLB	9 <sub>6</sub> /125 Bend-Insensitive Single-mode	(1310/1550)	ITU-T G.657.A & B ITU-T G.652.D	5 km <sup>4</sup>	10 km <sup>5</sup>	0.5/0.5	—	—

\* For backward compatibility to LED based systems, overfilled launch (OFL)

<sup>1</sup> 1310 nm CWDM lasers (10GBASE-LX4)

<sup>2</sup> Reach assuming 3.0 dB maximum cabled attenuation at 850 nm and 1.3 dB total connection and splice loss

<sup>3</sup> Supports 220 meter 10GBASE-LRM distance, or 300 meter 10GBASE-LRM distance with 300 meter capable equipment

<sup>4</sup> 3.5/1.5 dB/km maximum attenuation applies for DX-Series cables greater than 36 fibers, and for all DX-Series cables with armor (corrugated steel tape or interlocked armor) or any other secondary outer jacketing

<sup>5</sup> 10 km for 1310 nm 1000BASE-LH, and 5 km for 1310 nm 1000BASE-LX

<sup>6</sup> 10 km for 1310 nm 10GBASE-LR, and 40 km for 1550 nm 10GBASE-ER

<sup>7</sup> Nominal Mode Field Diameter at 1310 nm  
Note: many other fiber types, fiber bandwidth, and attenuation performances are available.

**GENERAL DYNAMICS**  
C4 Systems

SIZE  
**A**

DWG NO.  
19-2816080

REV  
-

CAGE CODE  
67032

SHEET  
8



Ordering Information

<b>G</b>					<b>K</b>				<b>9</b>		<b>P</b>
1	2	3	4	5	6	7	8	9	10	11	12

- 1 Subgrouped Distribution Series Ultra-Fox™ = **G**
- 2 6-fiber subgroups = **B**; 12-fiber subgroups = **X**
- 3 – 5 Fiber count: 6-fiber subgroups = **012 – 036**, 12-fiber subgroups = **024 – 144**
- 6 Jacket type: Fluoropolymer = **K**
- 7 – 9 Fiber type: (See Laser Ultra-Fox™ Fiber Performance Table)
- 10 250 µm fiber with 900 µm tight buffer = **9**
- 11 Standard Jacket Colors:  
 62.5 µm multimode (WLS, WLX): Orange = **O**  
 50 µm multimode (ALS, ALX): Orange = **O**  
 50 µm Ten-Gigabit multimode (ALT, ALE): Aqua = **Q**  
 Single-mode: Yellow = **Y**
- 12 Rating: Plenum = **P**

Example: 48-fiber cable (12-fiber subgroups) using 62.5 µm standard laser optimized fiber, orange jacket –

<b>G</b>	<b>X</b>	<b>0</b>	<b>4</b>	<b>8</b>	<b>K</b>	<b>W</b>	<b>L</b>	<b>S</b>	<b>9</b>	<b>O</b>	<b>P</b>
----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------	----------

SIZE <b>A</b>	DWG NO. 19-2816080	REV -	CAGE CODE <b>67032</b>	SHEET <b>9</b>
------------------	-----------------------	----------	---------------------------	-------------------