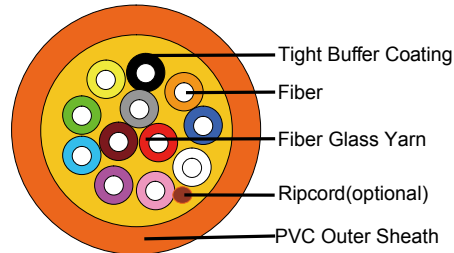


## Flame Retardant Tight Buffered Distribution Fiber Optic Cables

MTA-B-C-D-Y



### APPLICATION

This cables are used for interconnection of distribution boxes and end devices, where continued functionality is required during a fire situation. The cables are very suitable for various indoor and outdoor applications, including routing between buildings within ducts and inside building up to riser shafts.

### STANDARDS

Basic design adapted to Telcordia GR409-CORE / TIA/EIA 568B.3 / ICEA-S-83-596

### FIRE PERFORMANCE

Flame Retardance (Single Vertical Wire Test)**	EN 60332-1-2; IEC 60332-1-2; BS EN 60332-1-2; VDE 0482-332-1 ; NBN C 30-004 (cat. F1); NF C32-070-2.1(C2); CEI 20-35/1-2; EN 50265-2-1*; DIN VDE 0482-265-2-1*
Reduced Fire Propagation (Vertically-mounted bundled wires & cable test)**	EN 60332-3-22 (cat. A); IEC 60332-3-22; BS EN 60332-3-22; VDE 0482-332-3; NBN C 30-004 (cat. F2); NF C32-070-2.2(C1); CEI 20-22/3-4; EN 50266-2-4*; DIN VDE 0482-266-2-4

Note: Asterisk \*\* denotes that the standard compliance is optional, depending on the oxygen index of the PVC compound and the cable design.

### CABLE CONSTRUCTION

**Optical fibers:** Singlemode and multimode tight fibers, with tight buffer coating.

**Reinforcement:** Either aramid yarn or fiber glass is wound around the tube to provide physical protection and tensile strength, with added fire protection.

**Inner Sheath(optional):** Thermoplastic PVC compound type LTS3 as per BS 7655-6.1

**Ripcord(optional):** An optional ripcord can be located under the outer sheath to facilitate jacket removal.



### Armouring(optional):

STA: Corrugated steel tape armour

SWB: Steel wire braid

**Outer Sheath:** Thermoplastic PVC compound. UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option. Compliance to fire performance standard (IEC 60332-1, IEC 60332-3, UL 1581, UL 1666 etc) depends on the oxygen index of the PVC compound and the overall cable design. LSPVC can also be provided upon request.

### PHYSICAL AND THERMAL PROPERTIES

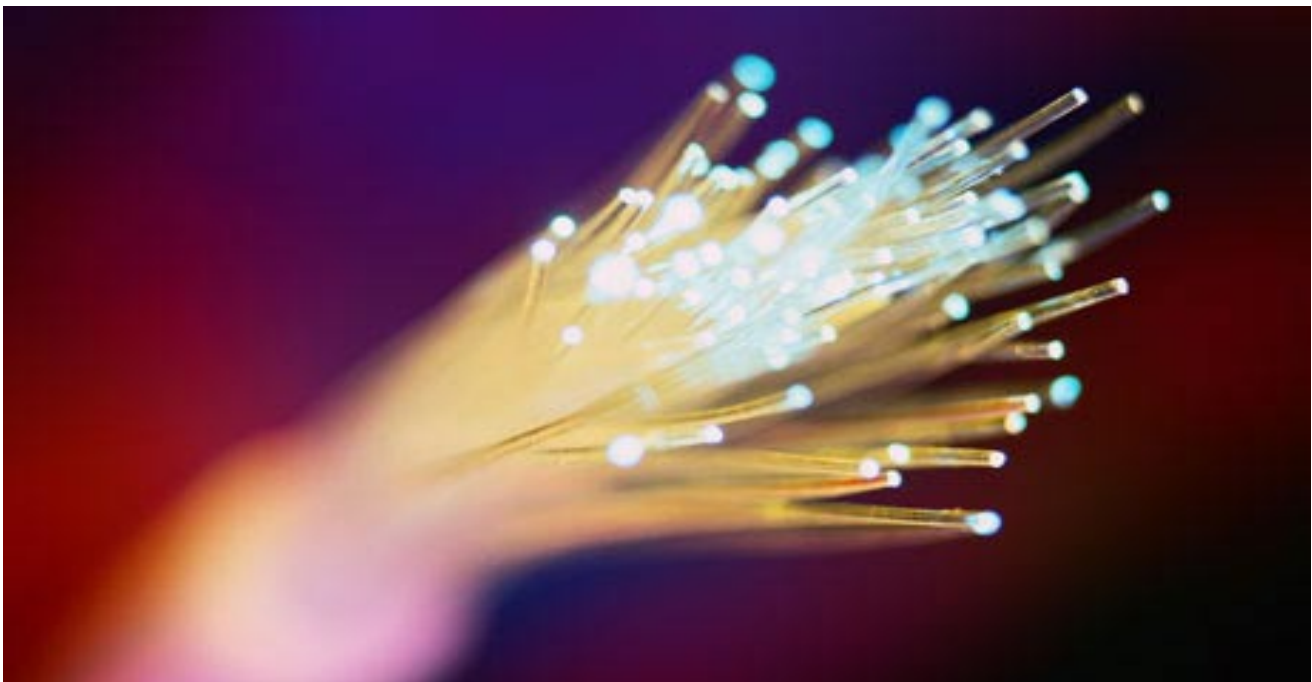
**Temperature range during operation (fixed state):** -20°C - +60°C

**Temperature range during installation (mobile state):** 0°C - +50°C

**Minimum bending radius:** 10 times the outer diameter for unarmoured cables  
20 times the outer diameter for armoured cables

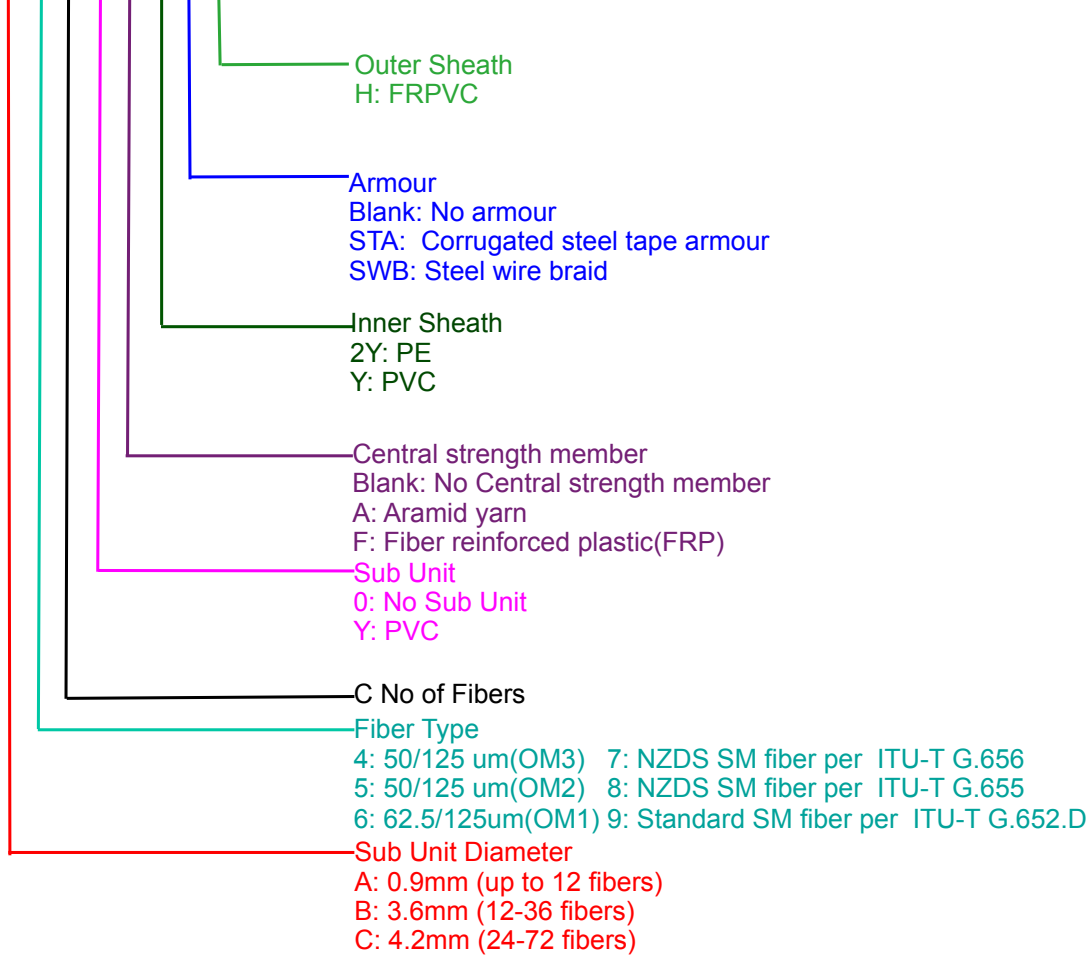
### CONSTRUCTION PARAMETERS

Cable Code	N° of Fibers	Nominal Overall Diameter	Max. Tensile Strength	Minimum Bending Radius	Approx. Weight
		mm	N	mm	kg/km
MTA-B-2-0-Y	2	7,6	250	76	55
MTA-B-4-0-Y	4	7,8	250	78	67
MTA-B-6-0-Y	6	8,6	400	86	77
MTA-B-8-0-Y	8	8,8	400	88	81
MTA-B-12-0-Y	12	9,3	400	93	90



### TYPE CODES

MTA-B-C-D-E-F-G-H



Standard



Standard



Flame Retardancy\*\*  
NF C32-070-2.1(C2)  
IEC60332-1-2/EN50265-2-1



Reduced Fire Propagation\*\*  
NF C32-070-2.2(C1)  
IEC60332-3-22/EN50266-2-4



### Flame Retardant Central Loose Tube Fiber Optic Cables

#### APPLICATION

These cables are characterized by light weight and small diameter, suitable for both aerial and duct installation. They are mainly installed inside buildings, tunnels,subways or closed areas in general, specially designed to guarantee the signal transmission even in case of fire. The cable can also be used for direct burial for armoured version.

#### STANDARDS

Basic design adapted to Telcordia GR-20 / RUS 7 CFR 1755.900 (REA PE-90) / ICEA S 87-640

#### FIRE PERFORMANCE

Flame Retardance (Single Vertical Wire Test)**	EN 60332-1-2; IEC 60332-1-2; BS EN 60332-1-2; VDE 0482-332-1 ; NBN C 30-004 (cat. F1); NF C32-070-2.1(C2); CEI 20-35/1-2; EN 50265-2-1*; DIN VDE 0482-265-2-1*
Reduced Fire Propagation (Vertically-mounted bundled wires & cable test)**	EN 60332-3-22 (cat. A); IEC 60332-3-22; BS EN 60332-3-22; VDE 0482-332-3; NBN C 30-004 (cat. F2); NF C32-070-2.2(C1); CEI 20-22/3-4; EN 50266-2-4*; DIN VDE 0482-266-2-4

Note: Asterisk \*\* denotes that the standard compliance is optional, depending on the oxygen index of the PVC compound and the cable design.

#### CABLE CONSTRUCTION

**Fibers:** Singlemode and multimode fibers, with loose tube technology.

**Structure:** Central loose tube cable contains one tube with 2-24 single or multimode fibers, which are filled with water blocking gel.

**Water blocking:** The jelly filled tube is waterblocked by using swellable tape and thread.

**Reinforcement:** Either aramid yarn or fiber glass is wound around the tube to provide physical protection and tensile strength, with added fire protection.

**Inner Sheath (optional):** The cable can be jacketed with either PE or thermoplastic PVC inner sheath. PE is the preferred option in outdoor environment for water protection purpose.

**Moisture Barrier Tape (optional):** An aluminum moisture tape can be incorporated under the sheath for water blocking and shielding purpose.

**Armouring(optional):**

For direct burial, either galvanized steel wire braid, corrugated steel tape armour or galvanized steel wire armour is applied over an inner polyethylene or PVC sheath. For steel tape armour, the 0.15mm thick steel tape is coated with a copolymer and applied with an overlap. For steel wire braid or armour, single layer of galvanized steel wire braid or armour is applied.

**Ripcord (optional):** An optional ripcord can be located under the jacket to facilitate jacket removal.

**Outer Sheath:** Thermoplastic PVC compound. UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option. Compliance to fire performance standard (IEC 60332-1, IEC 60332-3, UL 1581, UL 1666 etc) depends on the oxygen index of the

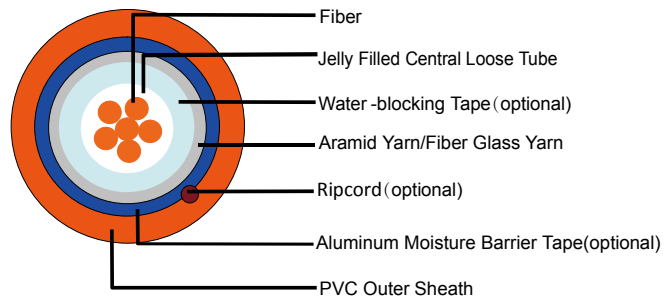
PVC compound and the overall cable design. LSPVC can also be provided upon request.

### FIBER COLOUR CODE

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

### CONSTRUCTION

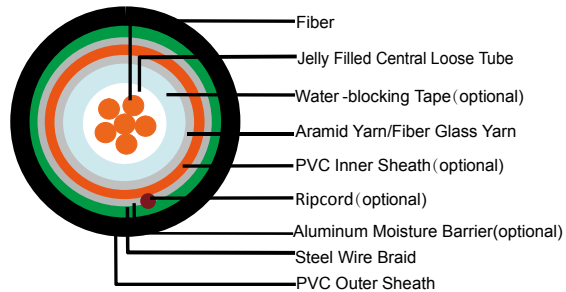
#### UNARMoured TYPE



#### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
CLA-B-C-Y-J	02-06	2.7	8.0	70	1000	1500
CLA-B-C-Y-J	08-16	3.5	9.0	90	1200	1500
CLA-B-C-Y-J	18-24	4.2	10.0	100	1500	1500

#### STEEL WIRE BRAID

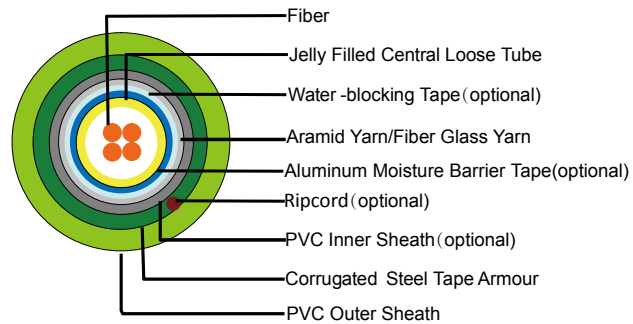
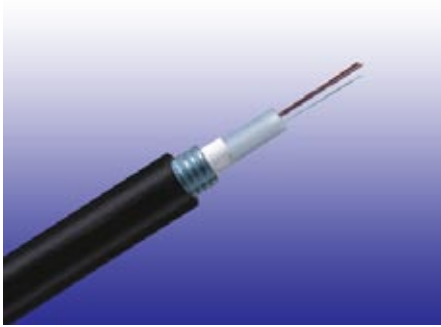




### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
CLA-B-C-2Y(SWB)Y-J	02-06	2.7	11.5	160	1000	2000
CLA-B-C-2Y(SWB)Y-J	08-16	3.5	12.0	180	1200	2000
CLA-B-C-2Y(SWB)Y-J	18-24	4.2	13.0	200	1500	2000

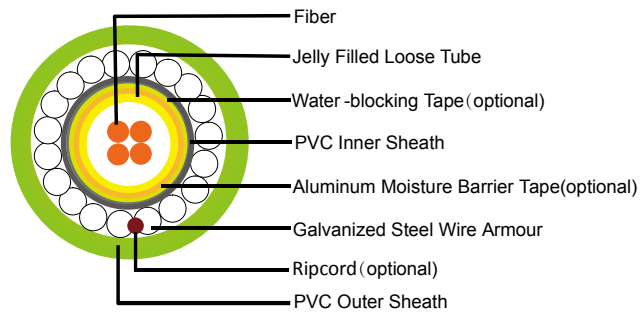
### CORRUGATED STEEL TAPE ARMOUR



### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
CLA-B-C-2Y(STA)Y-J	02-06	2.7	13.0	200	1000	2500
CLA-B-C-2Y(STA)Y-J	08-16	3.5	14.0	220	1200	2500
CLA-B-C-2Y(STA)Y-J	18-24	4.2	14.5	250	1500	2500

### STEEL WIRE ARMOUR



### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
CLA-B-C-2Y(SWA)Y-J	02-12	2.7	10.5	180	2500	4000
CLA-B-C-2Y(SWA)Y-J	16-24	3.5	11.0	210	2500	4000

### PHYSICAL AND THERMAL PROPERTIES

**Temperature range during operation (fixed state):** -20°C - +60°C

**Temperature range during installation (mobile state):** 0°C - +50°C

**Minimum Operation Bending Radius:** 10 times the outer diameter for unarmoured cables  
20 times the outer diameter for armoured cables

**Minimum Installation Bending Radius:** 20 times the outer diameter

### MECHANICAL PROPERTIES

Maximum Compressive Load	4000N for unarmoured cables 5000N for armoured cables
Repeated Impact:	4.4 N.m (J)
Twist (Torsion):	180×10 times, 125×OD
Cyclic Flexing:	25 cycles for armoured cables; 100 cycles for unarmoured cables.
Crush Resistance:	263N/cm (150lb/in)

### FIBER COMPLIANCE

Temperature Cycling	IEC60794-1-2-F2
Tensile Strength	IEC60794-1-2-E1A
Crush	IEC60794-1-2-E3
Impact	IEC60794-1-2-E4
Repeated Bending	IEC60794-1-2-E6
Torsion	IEC60794-1-2-E7
Kink	IEC60794-1-2-E10
Cable Bend	IEC60794-1-2-E11
Cool Bend	IEC60794-1-2-E11



# Caledonian

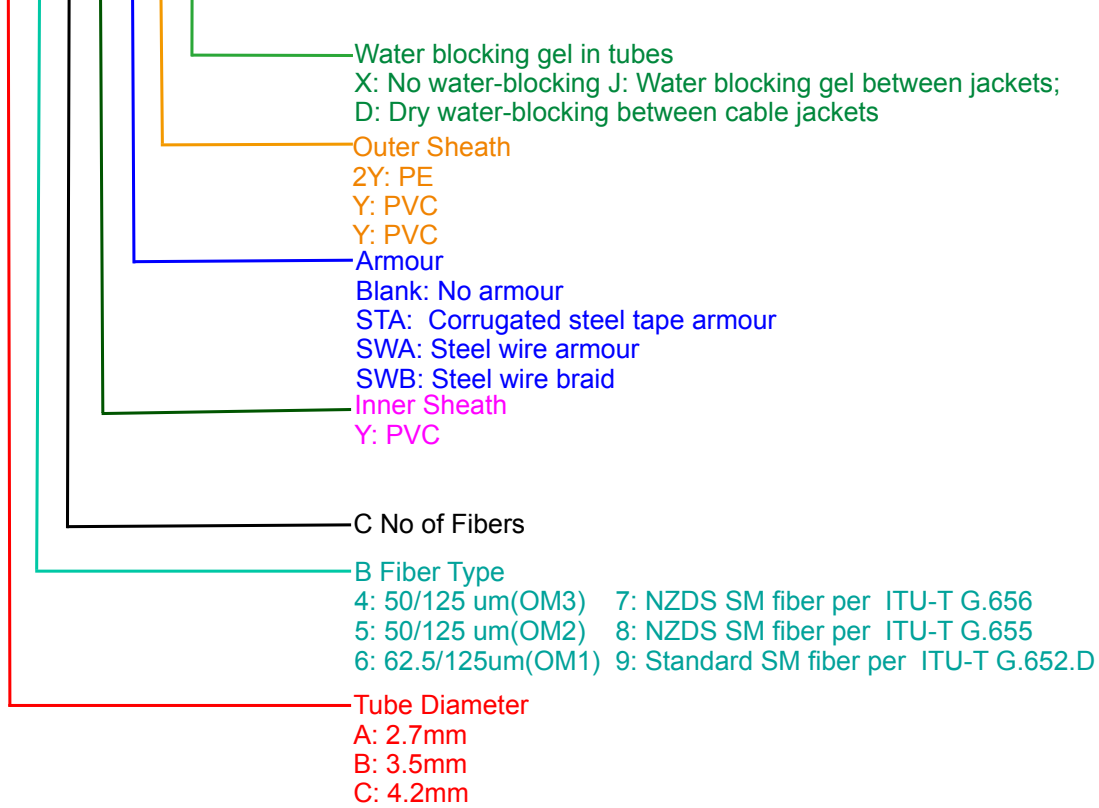
## Flame Retardant Optic Fiber Cables

www.caledonian-cables.co.uk    www.addison-cables.com



### TYPE CODES

**CLA-B-C-D-E-F-G**



Standard



Standard



Flame Retardancy\*\*  
NF C32-070-2.1(C2)  
IEC60332-1-2/EN50265-2-1



Reduced Fire Propagation\*\*  
NF C32-070-2.2(C1)  
IEC60332-3-22/EN50266-2-4



## Flame Retardant Multi Loose Tube Fiber Optic Cables

### APPLICATION

The multi loose tube non metallic cables are designed for outside plant, which is prone to electrical interference. They are mainly installed inside buildings, tunnels,subways or closed areas in general, specially designed to guarantee the signal transmission even in case of fire. The cable can also be used for direct burial for armoured version.

### STANDARDS

Basic design adapted to Telcordia GR-20 / RUS 7 CFR 1755.900 (REA PE-90) / ICEA S 87-640

### FIRE PERFORMANCE

Flame Retardance (Single Vertical Wire Test)**	EN 60332-1-2; IEC 60332-1-2; BS EN 60332-1-2; VDE 0482-332-1 ; NBN C 30-004 (cat. F1); NF C32-070-2.1(C2); CEI 20-35/1-2; EN 50265-2-1*; DIN VDE 0482-265-2-1*
Reduced Fire Propagation (Vertically-mounted bundled wires & cable test)**	EN 60332-3-22 (cat. A); IEC 60332-3-22; BS EN 60332-3-22; VDE 0482-332-3; NBN C 30-004 (cat. F2); NF C32-070-2.2(C1); CEI 20-22/3-4; EN 50266-2-4*; DIN VDE 0482-266-2-4

Note: Asterisk \*\* denotes that the standard compliance is optional, depending on the oxygen index of the PVC compound and the cable design.

### CABLE CONSTRUCTION

**Fibers:** Singlemode and multimode fibers, with loose tube technology.

**Structure:** The cable consists of 5 to 36 fibers containing tubes or fillers stranded in up to 3 layers around a central strength member and bound under a PVC sheath. Each tube contains 4 -12 fibers, which is filled with water blocking gel.

**Central Strength Member:** Solid or stranded steel wire coated with polyethylene is usually used as central strength member. Fiber glass reinforced plastics (FRP) will be used as central strength member if non metallic construction is required.

**Water Blocking:** The jelly filled tube is waterblocked by using swellable tape and thread.

**Reinforcement:** Either aramid yarn or fiber glass is wound around the tube to provide physical protection and tensile strength, with added fire protection.

**Inner Sheath (optional):** The cable can be jacketed with either PE or Thermoplastic PVC inner sheath. PE is the preferred option in outdoor environment for water protection purpose.

**Armouring(optional):** For direct burial, either galvanized steel wire braid, corrugated steel tape armour or galvanized steel wire armour is applied over an inner polyethylene or PVC sheath. For steel tape armour, the 0.15mm thick steel tape is coated with a copolymer and applied with an overlap. For steel wire braid or armour, single layer of galvanized steel wire braid or armour is applied.

**Moisture Barrier Tape (optional):** An aluminum moisture tape can be incorporated under the sheath for water blocking and shielding purpose.



**Ripcord (optional):** An optional ripcord can be located under the jacket to facilitate jacket removal.

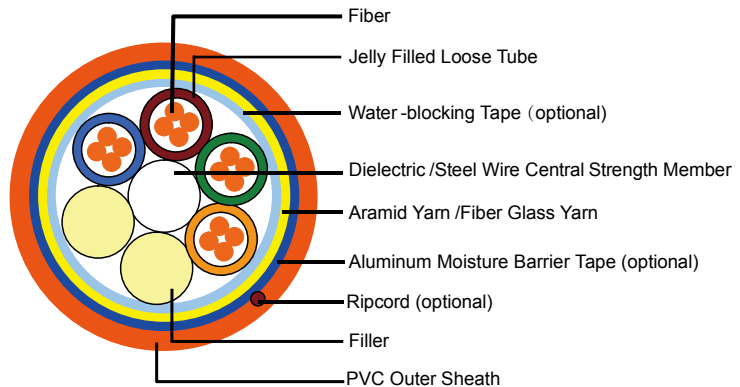
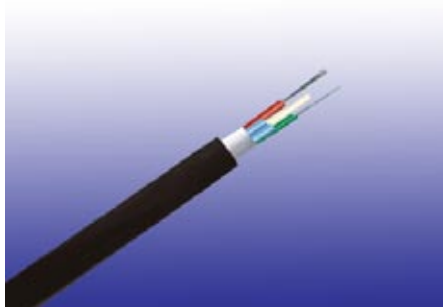
**Outer Sheath:** Thermoplastic PVC compound. UV resistance, hydrocarbon resistance, oil resistance, anti rodent and anti termite properties can be offered as option. Compliance to fire performance standard (IEC 60332-1, IEC 60332-3, UL 1581, UL 1666 etc) depends on the oxygen index of the PVC compound and the overall cable design. LSPVC can also be provided upon request.

### FIBER COLOUR CODE

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

### CONSTRUCTION

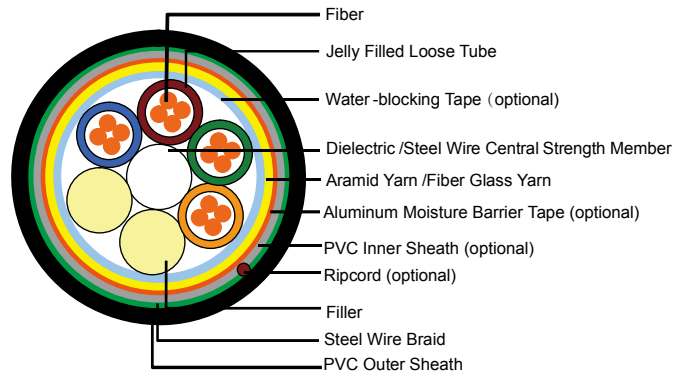
#### UNARMoured TYPE



### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
MLA-B-C×D-F-Y-J	72	2.5	15.0	230	4000	3000
MLA-B-C×D-F-Y-J	96	2.5	16.5	250	4000	3000
MLA-B-C×D-F-Y-J	144	2.5	20.5	280	4000	3000

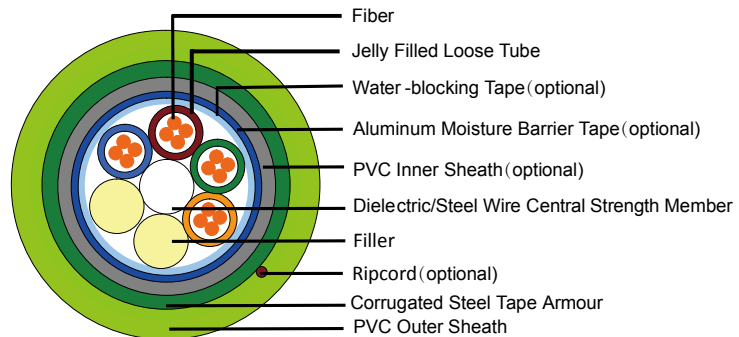
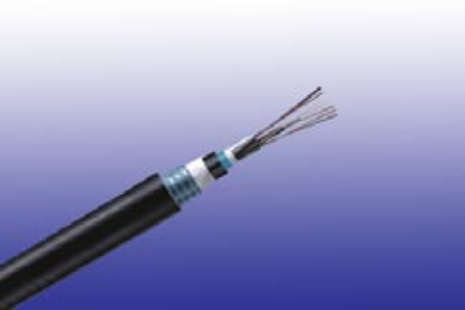
### STEEL WIRE BRAID



### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
MLA-B-C×D-F-2Y(SWB)Y-J	72	2.5	15.0	280	3000	3500
MLA-B-C×D-F-2Y(SWB)Y-J	96	2.5	17.5	310	3000	3500
MLA-B-C×D-F-2Y(SWB)Y-J	144	2.5	21.5	350	3500	3500

### CORRUGATED STEEL TAPE ARMOUR

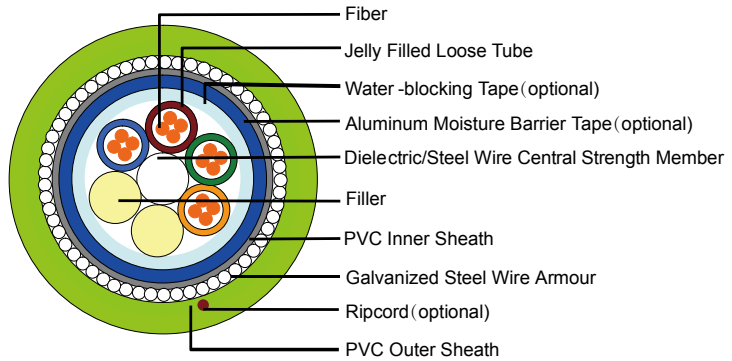
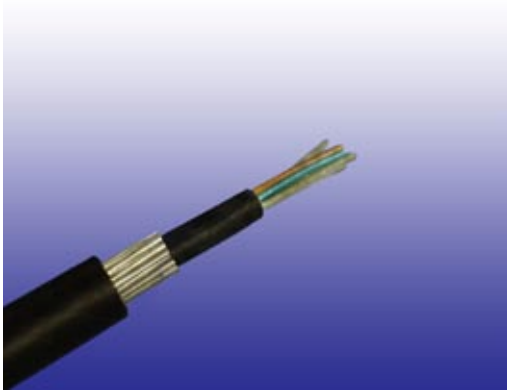


### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
MLA-B-C×D-F-2Y(STA)Y-J	72	2.5	16.5	290	3000	7500
MLA-B-C×D-F-2Y(STA)Y-J	96	2.5	18.5	350	3000	7500
MLA-B-C×D-F-2Y(STA)Y-J	144	2.5	22.5	450	3500	7500



### STEEL WIRE ARMOUR



### CONSTRUCTION PARAMETERS

Cable Code	Fiber Count	Tube Diameter	Nominal Overall Diameter	Approx. Weight	Tension load	Crush
	(n°)	mm	mm	kg/km	N	N/100mm
MLA-B-C×D-F-2Y(SWA)Y-J	72	2.0	15.0	360	3500	5000
MLA-B-C×D-F-2Y(SWA)Y-J	96	2.0	16.5	390	4000	5000
MLA-B-C×D-F-2Y(SWA)Y-J	144	2.0	18.5	430	4500	5000

### PHYSICAL AND THERMAL PROPERTIES

**Temperature range during operation (fixed state):** -20°C - +60°C

**Temperature range during installation (mobile state):** 0°C - +50°C

**Minimum Installation Bending Radius:** 20 times the outer diameter

**Minimum Operation Bending Radius:** 10 times the outer diameter for unarmoured cables

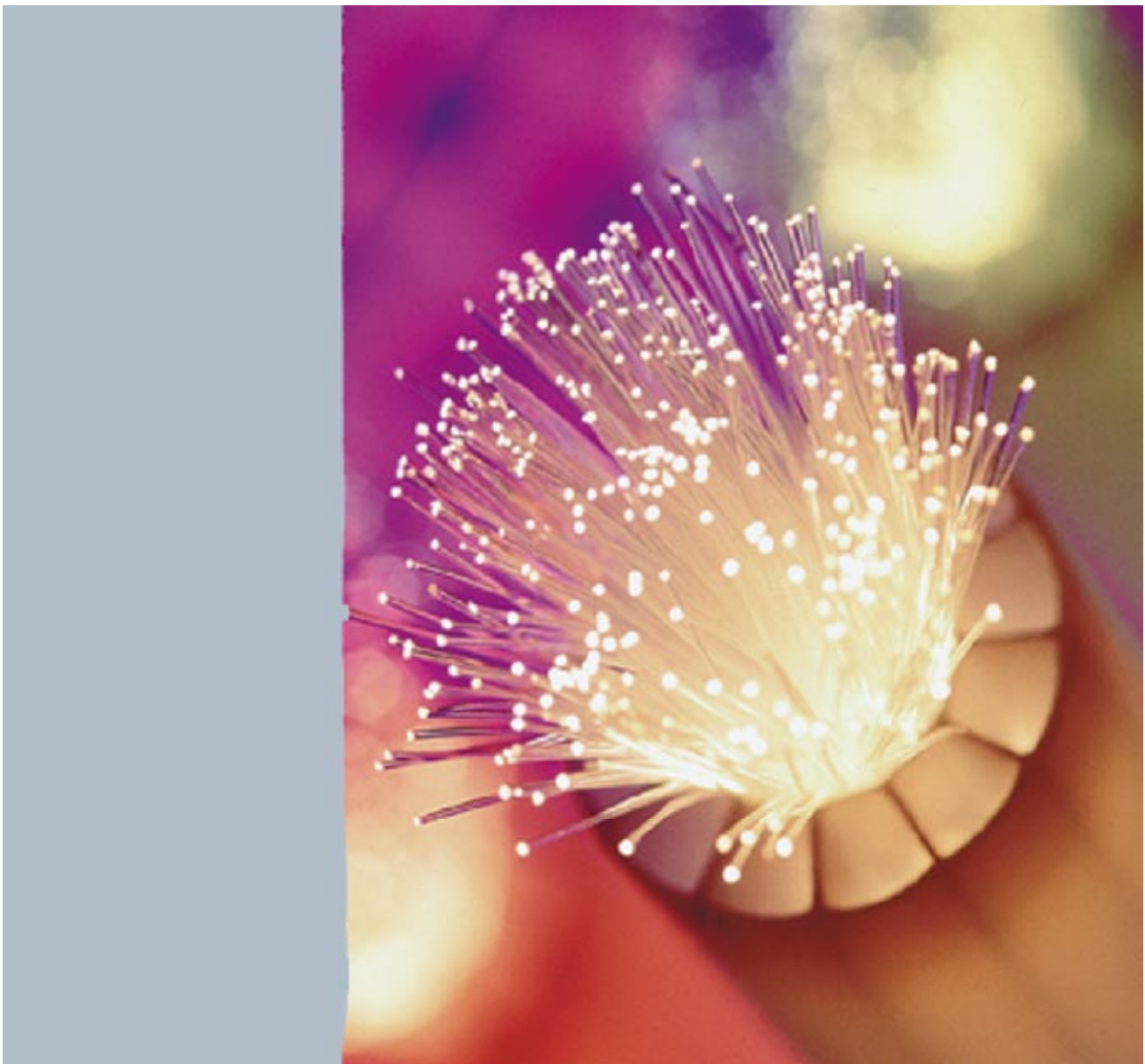
20 times the outer diameter for armoured cables

### MECHANICAL PROPERTIES

Maximum Compressive Load:	4000N for unarmoured cables 6000N for armoured cables
Repeated Impact:	4.4 N.m (J)
Twist (Torsion):	180×10 times, 125×OD
Cyclic Flexing:	25 cycles for armoured cables 100 cycles for unarmoured cables
Crush Resistance:	220N/cm(125lb/in)

### FIBER COMPLIANCE

Temperature Cycling	IEC60794-1-2-F2
Tensile Strength	IEC60794-1-2-E1A
Crush	IEC60794-1-2-E3
Impact	IEC60794-1-2-E4
Repeated Bending	IEC60794-1-2-E6
Torsion	IEC60794-1-2-E7
Kink	IEC60794-1-2-E10
Cable Bend	IEC60794-1-2-E11
Cool Bend	IEC60794-1-2-E11





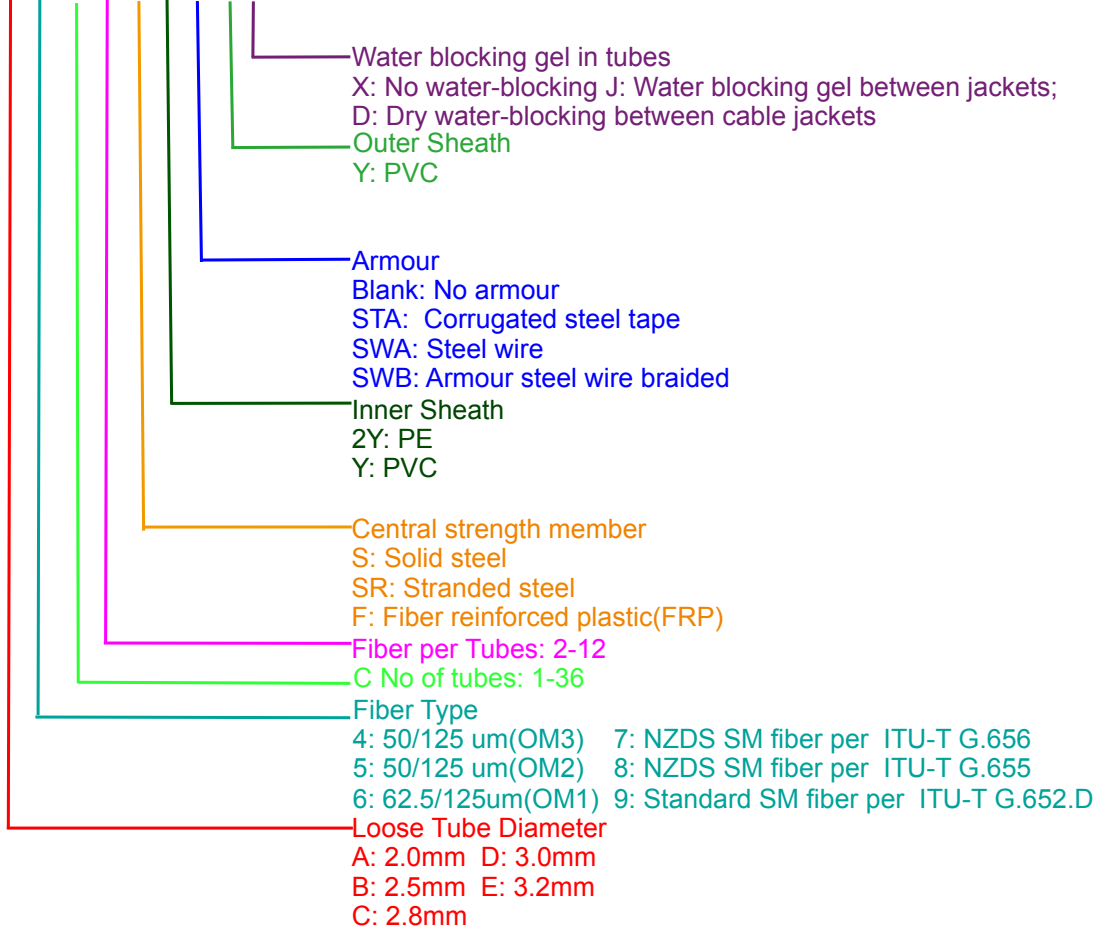
# Caledonian Flame Retardant Optic Fiber Cables

www.caledonian-cables.co.uk www.addison-cables.com



## TYPE CODES

**MLA-B-CxD-E-F-G-H-I**



Standard



Standard



Flame Retardancy\*\*  
NF C32-070-2.1(C2)  
IEC60332-1-2/EN50265-2-1



Reduced Fire Propagation\*\*  
NF C32-070-2.2(C1)  
IEC60332-3-22/EN50266-2-4

## Technical Information For Fiber Optic Cables

### Optical & Geometrical Properties for Single Mode Fibers

Parameter		Standard Single Mode Fiber per ITU-T G.652D	Non-zero Dispersion Shifted fiber per ITU-T G.655	Non-zero Dispersion Shifted fiber per ITU-T G.656	Units
<b>Fiber Code</b>		9	8	7	
Attenuation, Loose Tube Cables		Standard	Metro Area	Long Haul	
	@1310nm	≤0.35	-	-	dB/km
	@1550nm	≤0.22	≤0.22	≤0.22	dB/km
	@1625nm	≤0.25	≤0.26	≤0.26	dB/km
Attenuation, Tight Buffer or Semi-Tight Cables					
	@1310nm	≤0.38	-	-	dB/km
	@1550nm	≤0.28	-	-	dB/km
Chromatic Dispersion	between 1260 and 1360nm (O Band)	≤3.5	NA-	-	ps/(nm*km)
	between 1460 and 1530nm (S Band)	-	-	2.0-7.0	ps/(nm*km)
	between 1530 and 1565nm (C Band)	≤18	1.0-10.0	7.0-10.0	ps/(nm*km)
	between 1565 and 1625nm (L Band)	≤22	7.0-12.0	10.0-14.0	ps/(nm*km)
Zero Dispersion Wavelength		1310±11	≤1520	≤1420	nm
Zero Dispersion Slope		0.093	0.093	0.093	ps/(nm <sup>2</sup> .km)
Point Discontinuity at 1300nm & 1550nm		0.1	0.1	0.1	dB
Mode Field Diameter	@1300nm	9.3±0.5	-	-	um
	@1550nm	10.4±0.8	8.5±0.6	9.0±0.5	um
Cable Cut-off Wavelength		≤1260	≤1450	≤1310	nm
PMD (Individual fiber)		≤0.2	≤0.2	≤0.2	ps/km 1/2
Cladding Diameter		125±1	125±1	125±1	um



Core/Cladding Concentricity Error	≤0.5	≤0.5	≤0.6	um
Cladding Non-Circularity	≤1.0	≤1.0	≤1.0	%
Coating Non-Circularity	≤6.0	≤6.0	≤6.0	%
Primary Coating Diameter	245±10	245±10	245±10	um
Proof-Test Level	100 (0.7)	100 (0.7)	100 (0.7)	Kpsi/GN/m <sup>2</sup>
Fatigue Coefficient	≥20	≥20	≥20	
Temperature Dependence between 0°C ~ +70°C @ 1310 & 1550nm	0.1	0.1	0.1	Db/km

### Optical & Geometrical Properties for Multimode Fibers

Parameter		50/125		62.5/125	Units
Fiber Code		5	4	6	-
ISO/IEC 11801 Classification(2)		<b>OM2</b>	<b>OM3</b>	<b>OM1</b>	-
Attenuation, Loose Tube Cables					
@850nm		≤3.0		≤3.0	dB/km
@1300nm		≤0.8		≤0.8	dB/km
Attenuation, Tight Buffer and Semi-tight Cables					
@850nm		≤3.0		≤3.5	dB/km
@1300nm		≤1.0		≤1.0	dB/km
Bandwidth*	@850nm	≥500	≥2000	≥200	MHz*km
	@1300nm	≥800/500	≥500	≥500/600	MHz*km
Numerical Aperture		0.20±0.015		0.275±0.015	-
Core Diameter		50±3		62.5±3	um
Cladding Diameter		125±2		125±2	um
Core/Cladding Concentricity		≤1.5		≤1.5	um
Core Non-Circularity		≤6		≤6	%
Cladding Non-Circularity		≤2 1		≤2 1	%
Core/Cladding Offset		≤3		≤3	um
Coating Diameter		245±10		245±10	um
Proof-Test Level		100 (0.7)		100 (0.7)	Kpsi (GN/m <sup>2</sup> )
Fatigue Coefficient		≥20		≥20	
Temperature Dependence between 0°C ~ +70°C		0.1		0.1	dB



### Mechanical & Environmental Properties for Single Mode Fiber

Testing Parameters	EIA/ TIA-455 FOTP Number	IEC-794-1 Test Method	EN 187000 Test Method	Maximum Increased loss
Tensile Load & Bending	33	E1	501	<0.05dB (90%); <0.15dB (100%)
Low & High Temperature Bend	37	E11		<0.05dB (90%); <0.15dB (100%)
Compression loading (Crush)	41	E3	504	<0.05dB (90%); <0.15dB (100%) 440N/km(250lb/in) load
Impact Resistance	25	E4	505	<0.05dB (90%); <0.15dB (100%)
Twist (Torson)	85	E7	508	<0.05dB (90%); <0.15dB (100%)
Cyclic Flexing (Repeated Bending)	104	E6	509	<0.05dB (90%); <0.15dB (100%)
External freezing	98	F6		<0.05dB (90%); <0.15dB (100%)
Temperature Cycling	3	F1	601	<0.05dB (90%); <0.15dB (100%)
Fiber Stripability	178	B6		<8.9N(2lbf) on unaged and aged fiber; >1.3N(0.3lbf) on unaged and aged fiber
Cable Aging	82	F5		<0.1dB (90%); <0.25dB (100%)
Water Penetration	82	F5		No flow after 24 hours from 1 meter length of cable
Compound Flow (Drip)	81	E14		80°C 24 hours duration, no drip



### Mechanical & Environmental Properties for Multi Mode Fiber

Testing Parameters	EIA/TIA-455 FOTP Number	IEC-794-1 Test Method	EN 187000 Test Method	Maximum Increased loss
Tensile Load & Bending	33	E1	501	<0.2dB
Low & High Temperature Bend	37	E11		<0.4dB
Compression loading (Crush)	41	E3	504	<0.2dB 440N/km(250lb/in) load
Cyclic Impact	25	E4	505	<0.4dB
Twist (Torsion)	85	E7	508	<0.2dB
Cyclic Flexing (Repeated Bending)	104	E6	509	<0.2dB
External freezing	98	F6		<0.2dB
Temperature Cycling	3	F1	601	<0.05dB (90%); <0.15dB (100%)
Fiber Stripability	178	B6		<13.4N(3lbf) on unaged fiber
Cable Aging	82	F5		<0.1dB (90%); <0.25dB (100%)
Water Penetration	82	F5		No flow after 24 hours from 1 meter length of cable
Compound Flow (Drip)	81	E14		80°C 24 hours duration, no drip