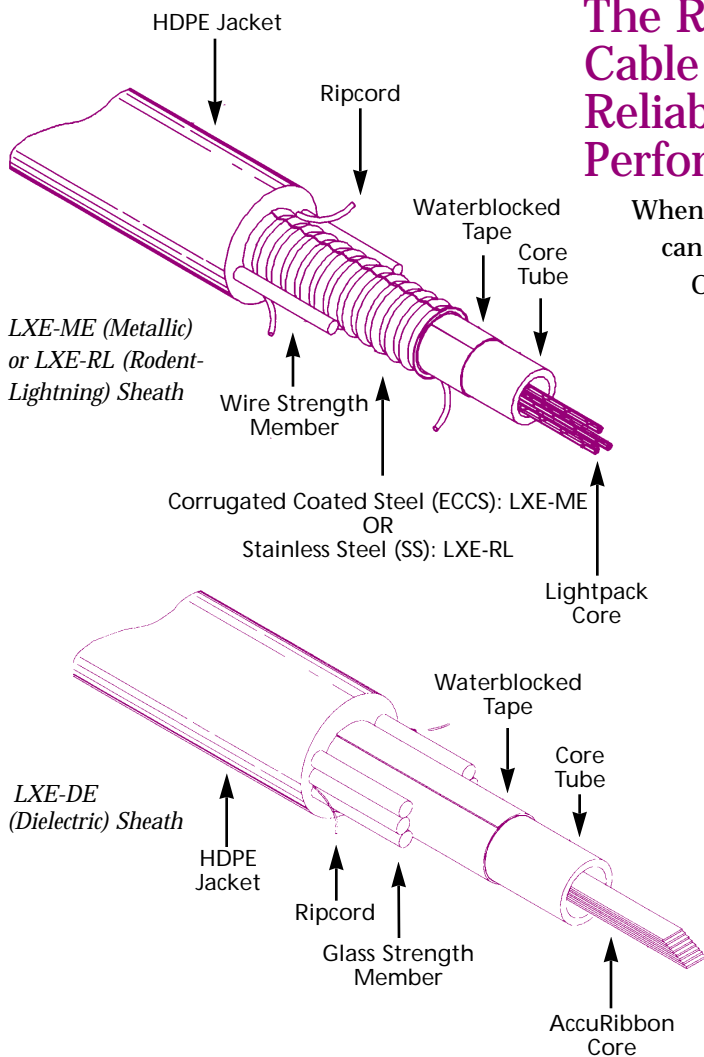




# LXE Fiber Optic Cable

Easy-to-Install, Compact Cable  
Protects Your Network in  
Outside Plant Environments



## The Reliable Cable Solution for Reliable Network Performance

When reliability counts, you can count on LXE Fiber Optic Cable. The LXE family of products is designed for the loop distribution market, where express entry (accessing fiber in the middle of a cable span) is a common practice. These cables provide excellent optical, mechanical, and environmental performance in compact, reliable designs.

## Rugged, Robust Design for Optimal Performance in Outside Plant (OSP) Applications

The LXE sheath system achieves a 600-pound (2670 N) tensile rating through the use of linearly applied strength members placed 180 degrees opposite each other. The cable jacket is made of High Density Polyethylene (HDPE) to provide faster installation (through a lower coefficient of friction) and optimum cable core protection in hostile environments. The small size and light weight make installation easy. In addition, the LXE sheath system passes both the Telecommunications Industry Association/Electronic Industries Association (TIA/EIA) standard cable tests and the more stringent Lucent Technologies test program.

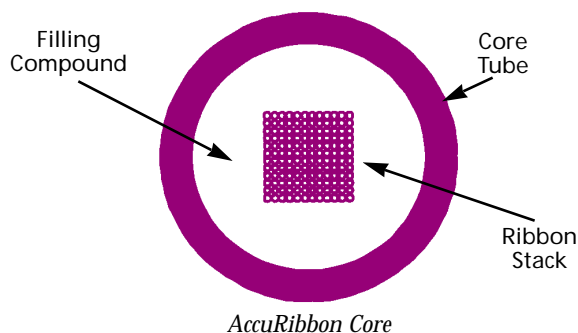
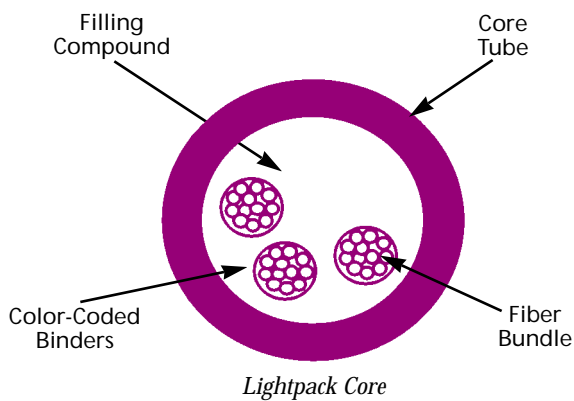
### LXE Fiber Optic Cable Features at a Glance

- Lucent Technologies Single-Mode, Multimode, AllWave™ and TrueWave® fibers with D-LUX® Coating
- Compact size
- Rugged, robust design
- Variety of sheath and core options
- All fibers in central core tube
- Ideally suited to mass splicing techniques
- High density polyethylene sheath
- High strength to weight ratio

### LXE Fiber Optic Cable Benefits to the Customer

- Reliable network performance
- Excellent optical, mechanical, and environmental performance
- Improved craft productivity (installation and splicing)
- Simplified fiber administration
- Maximum transmission capacity in a compact design
- Protection from environmental hazards and installation abuse

### Cross-sections of Lightpack and AccuRibbon cores are shown below:



## Flexible Design Options for Variety of Customer Needs

The cables are available in both metallic and dielectric sheath options. A Rural Utilities Services (RUS) listed version of the sheaths is also available. Design flexibility is also offered with the cable core options. The LXE family of cables is available with an AccuRibbon® core containing up to 216 single-mode fibers or a Lightpack® core with up to 96 single-mode or multimode fibers.

## Design Flexibility — Two Core Options

The LXE sheaths are available with a Lightpack or AccuRibbon core.

The Lightpack cable core is a bundle of 4 to 12 fibers held together loosely with two helically applied binders. The core consists of an extruded plastic tube, containing filling compound and up to eight fiber bundles (up to 96 fibers). Positive identification of each fiber is provided by color coding both the fibers and the binders.

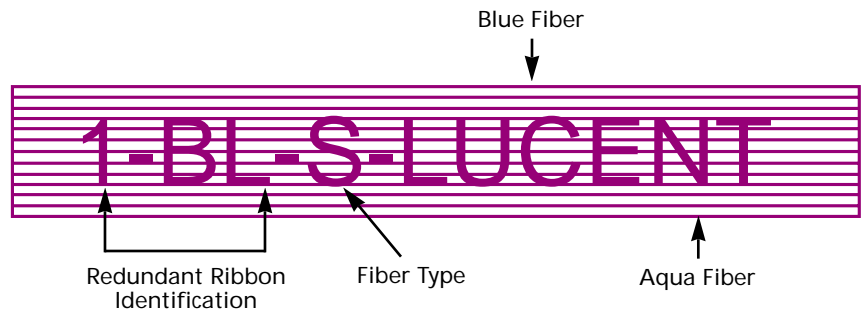
The AccuRibbon cable core consists of ribbons of 12 fibers bonded by a UV light-curable matrix material. Up to eighteen ribbons can be contained in the extruded plastic core tube for a total of 216 fibers. Positive identification of each fiber is provided by color coding the fibers within each uniquely identified ribbon.

# Easy Fiber, Bundle, and Ribbon Identification

All fibers used in Lightpack bundles and AccuRibbon units are color coded to facilitate individual fiber identification. The individual fiber colors are given in the following table.



Fiber No.	Fiber Color
1	Blue (BL)
2	Orange (OR)
3	Green (GR)
4	Brown (BR)
5	Slate (SL)
6	White (WH)
7	Red (RD)
8	Black (BK)
9	Yellow (YL)
10	Violet (VI)
11	Rose (RS)
12	Aqua (AQ)



This table lists the different markings for each of the ribbons in an AccuRibbon cable.

Each bundle of up to 12 fibers in a Lightpack cable can be uniquely identified through the use of a single color code for the binder. The binder colors follow the same sequence as the fiber colors. For example, in a 96-fiber cable, the first bundle of fibers is bound by a Blue (BL) binder, and the eighth bundle of fibers is bound by a Black (BK) binder.

Each AccuRibbon unit has identifying marks at approximately 150 mm (6 inch) intervals along its length. These marks uniquely identify each AccuRibbon unit within a cable. For a standard 12-fiber ribbon, the marking consists of four character sets separated by dashes as shown to the right.

Ribbon No.	Ribbon Marking	Fiber Type
1	*1-BL-X-LUCENT*	
2	*2-OR-X-LUCENT*	
3	*3-GR-X-LUCENT*	
4	*4-BR-X-LUCENT*	
5	*5-SL-X-LUCENT*	X= S for Matched Cladding Fiber
6	*6-WH-X-LUCENT*	
7	*7-RD-X-LUCENT*	
8	*8-BK-X-LUCENT*	= AW for AllWave™ Fiber
9	*9-YL-X-LUCENT*	
10	*10-VI-X-LUCENT*	
11	*11-RS-X-LUCENT*	= TW for TrueWave® Fiber
12	*12-AQ-X-LUCENT*	
13	*13-DBL-X-LUCENT*	
14	*14-DOR-X-LUCENT*	= 62.5 for 62.5µm Fiber
15	*15-DGR-X-LUCENT*	
16	*16-DBR-X-LUCENT*	
17	*17-DSL-X-LUCENT*	
18	*18-DWH-X-LUCENT*	

# Specifications

## Nominal dimensions of AccuRibbon cross section

Number of Fibers/Ribbon	Width mm (in)	Height mm (in)
12	3.14 (.1236)	.305 (.0120)

## Lightpack Core

SHEATH TYPE	Fiber Count						
	DE/ME/RL (4-24 Fibers)		ME/RL (30-48 Fibers) DE (6-48 Fibers)		DE/ME/RL (60-96 Fibers)		
	Core OD in (mm)						
	0.20 (5.1)		0.24 (6.1)		0.31 (7.9)		
SHEATH TYPE	Cable Diameter and Mass						
	OD in (mm)	Mass lbm/kft (kg/km)	OD in (mm)	Mass lbm/kft (kg/km)	OD in (mm)	Mass lbm/kft (mm)	
	<b>Metallic LXE-ME</b>	0.45 (11.4)	88 (131)	0.51 (13.0)	120 (179)	0.61 (15.5)	150 (223)
	<b>Rodent-Lightning LXE-RL</b>	0.45 (11.4)	88 (131)	0.51 (13.0)	120 (179)	0.61 (15.5)	150 (223)
<b>Dielectric LXE-DE</b>	-	-	0.51 (13.0)	95 (141)	0.61 (15.5)	125 (186)	

## AccuRibbon Core

DE/ME/RL  SHEATH TYPE	Fiber Count				
	DE/ME/RL (12-144 Fibers)		DE/ME/RL (156-216 Fibers)		
	Core OD in (mm)				
	0.31 (7.9)		0.41 (10.4)		
SHEATH TYPE	Cable Diameter and Mass				
	OD in (mm)	Mass lbm/kft (kg/km)	OD in (mm)	Mass lbm/kft (kg/km)	
	<b>Metallic LXE-ME</b>	0.61 (15.5)	156 (223)	0.71 (18.0)	203 (302)
	<b>Rodent-Lightning LXE-RL</b>	0.61 (15.5)	150 (223)	0.71 (18.0)	203 (302)
<b>Dielectric LXE-DE</b>	0.61 (15.5)	125 (186)	0.71 (18.0)	170 (253)	

## Three Sheath Options Provide Protection from Environmental Hazards

Three sheath options are available: Metallic (LXE-ME), Dielectric (LXE-DE), and Rodent-Lightning (LXE-RL).

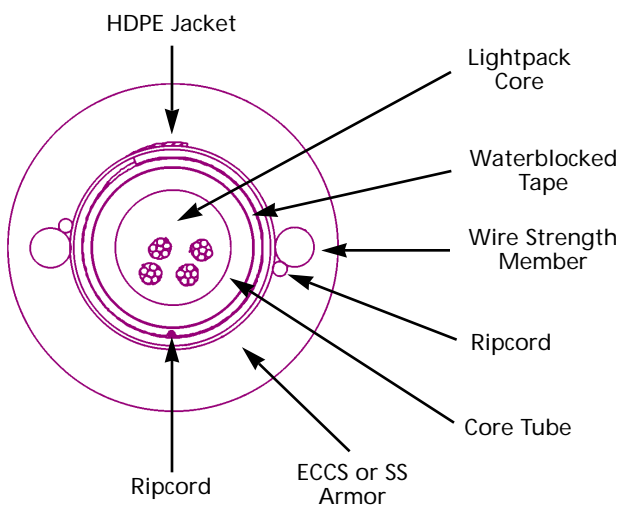
The construction of the LXE-ME sheath is shown below. An overlapped armor layer of 0.15 mm (0.006 in) thick corrugated electrolytic chrome coated steel (ECCS) envelops the core tube and has a ripcord under it to ease its removal. The steel armor is coated to inhibit

corrosion and to bond to the outer jacket. Two steel wire strength members run longitudinally along the armor, diametric to each other. A ripcord is located next to each steel wire for ease of sheath removal. The sheath is completed with a black high density polyethylene (HDPE) jacket.

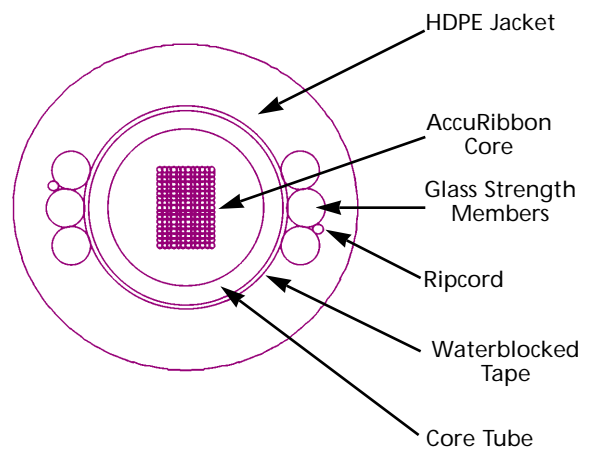
The construction of the LXE-RL sheath is the same as the LXE-ME sheath except the ECCS armor is replaced with an adhesive-coated 0.13 mm (0.005 in.) stainless steel (SS) armor which provides additional protection against rodents and lightning.

The LXE-DE sheath is also shown below. Two groups of glass strength members are longitudinally applied, diametrical to each other, over the cable core. Two rip cords, nestled along the strength members, are provided to facilitate sheath entry. The sheath is completed with a black high density polyethylene (HDPE) jacket.

For each sheath option, cable entry is extremely easy, even in mid-span. The cable core can be accessed with the strength members remaining intact, so cable tensile strength is maintained. In the metallic versions, electrical continuity is also maintained.



*LXE-ME (Metallic) or LXE-RL (Rodent-Lightning)*



*LXE-DE (Dielectric)*

## Mechanical, Environmental, and Electrical Requirements for Single-Mode Fiber Optic Cables

Cable Test	Test Method*	Requirement
Tensile Loading and Bending	TIA/EIA-455-33 IEC 60794-1-E1	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
Cyclic Flexing	TIA/EIA-455-104 IEC 60794-1-E6	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
Cyclic Impact	TIA/EIA-455-25 IEC 60794-1-E4	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
Compressive Loading	TIA/EIA-455-41 IEC 60794-1-E3	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss 440 N/cm (250 lbf/in) Load
Twist	TIA/EIA-455-85 IEC 60794-1-E7	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
Low and High Temperature Bend	TIA/EIA-455-37 IEC 60794-1-E11	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
External Freezing	TIA/EIA-455-98 IEC 60794-1-F6	90% ≤ 0.05 dB Max. Added Loss 100% ≤ 0.15 dB Max. Added Loss
Fiber Strippability	TIA/EIA-455-178 IEC 60793-1-B6	≤8.9 N (2 lbf) on unaged and aged fiber ≥1.3N (0.3 lbf) on unaged and aged fiber
Temperature Cycling	TIA/EIA-455-3 IEC 60794-1-F1	≤0.05 dB/km Mean Added Loss ≤0.15 dB/km Max. Added Loss
Cable Aging	TIA/EIA-455-3 IEC 60794-1-F1	≤0.10 dB/km Mean Added Loss ≤0.25 dB/km Max. Added Loss
Water Penetration	TIA/EIA-455-82 IEC 60794-1-F5	No flow after 24 hours from one meter length of cable
Sheath-to-Ground Dielectric Strength		≥20 kV for all armored metallic sheaths
Compound Drip	TIA/EIA-455-81 IEC 60794-1-E14	80°C, 24 hours duration, no drip
Lightning Conduction	TIA/EIA-455-181	Bellcore Category I for all armored metallic sheaths

\* Lucent complies with the latest revision of the TIA/EIA Test Method (There is not exact correspondence of TIA/EIA Fiber Optic Test Procedures (FOTPs) and IEC Test Methods.)

## Mechanical, Environmental, and Electrical Requirements for Multimode Fiber Optic Cables

Cable Test	Test Method*	Requirement
Tensile Loading and Bending	TIA/EIA-455-33 IEC 60794-1-E1	0.20 dB Max. Mean Added Loss
Cyclic Flexing	TIA/EIA-455-104 IEC 60794-1-E6	0.20 dB Max. Mean Added Loss
Cyclic Impact	TIA/EIA-455-25 IEC 60794-1-E4	0.40 dB Max. Mean Added Loss
Compressive Loading	TIA/EIA-455-41 IEC 60794-1-E3	0.20 dB Max. Mean Added Loss 440 N/cm (250 lbf/in) Load
Twist	TIA/EIA-455-85 IEC 60794-1-E7	0.20 dB Max. Mean Added Loss
Low and High Temperature Bend	TIA/EIA-455-37 IEC 60794-1-E11	0.40 dB Max. Mean Added Loss
External Freezing	TIA/EIA-455-98 IEC 60794-1-F6	0.20 dB Max. Mean Added Loss
Fiber Strippability	TIA/EIA-455-178 IEC 60793-1-B6	≤13.4 N (3 lbf) on unaged fiber
Temperature Cycling	TIA/EIA-455-3 IEC 60794-1-F1	≤0.5 dB/km Max. Added Loss 80 % ≤0.25 dB/km Added Loss
Cable Aging	TIA/EIA-455-3 IEC 60794-1-F1	≤1.0 dB/km Max. Added Loss 80 % ≤0.5 dB/km Added Loss
Water Penetration	TIA/EIA-455-82 IEC 60794-1-F5	No flow after one hour from one meter length of cable
Compound Drip	TIA/EIA-455-81 IEC 60794-1-E14	80°C, 24 hour duration, no drip
Sheath-to-Ground Dielectric Strength		≥20 kV for all armored metallic sheaths
Lightning Conduction	TIA/EIA-455-181	Bellcore Category I for all armored metallic sheaths

\* Lucent complies with the latest revision of the TIA/EIA Test Method (There is not exact correspondence of TIA/EIA Fiber Optic Test Procedures (FOTPs) and IEC Test Methods.)

## Mechanical and Environmental Requirements for Single-Mode Fiber Ribbons

Ribbon Test	Test Method*	Requirement
Ribbon Dimensions (Unaged)	Bellcore GR-20, Section 5.1.2	12-Fiber Ribbon: Width $\leq 3.22$ mm. Height $\leq 0.360$ mm, Planarity $\leq 0.075$ mm, Extreme fibers $\leq 2.882$ mm
Resistance to Twist (Unaged and Aged)	Bellcore GR-20, Section 5.2.1.	After 20 cycles, $\pm 180^\circ$ twist, no fiber separation or de-bonding.
Ribbon Separation (Unaged)	Bellcore GR-20, Section 5.2.2	<ul style="list-style-type: none"> <li>Fiber peel force <math>\leq 4.4</math> N (1 lbf)</li> <li>Matrix material removable</li> <li>Color retained, any 2.5 cm identifiable</li> <li>Single fiber and Sub-group separable</li> </ul>
Ribbon Residual Twist (Flatness) (Aged)	Bellcore GR-20, Section 5.2.3 and FOTP-131	$< 360^\circ$ twist per 0.4 meter
Ribbon Strippability • Ribbon (Unaged & Aged)	Bellcore GR-20, Sections 5.3.4, 6.3.4 and ITM-118	• Ribbon strips with no fiber breaks and residue removed after one wipe with alcohol pad.
Cable Material Compatibility Wasp Spray Exposure	Bellcore GR-20, Section 6.3.4 Section 6.6.8	Aged ribbons shall not exhibit cracking, splitting or delamination after aging

\* Lucent complies with the latest revision of the TIA/EIA Test Method (There is not exact correspondence of TIA/EIA Fiber Optic Test Procedures (FOTPs) and IEC Test Methods.)

## Ordering Information

Lucent Technologies LXE cables can be custom ordered in various lengths. The customer

specifies a particular fiber optic cable design, fiber count, fiber type and transmission parameter by a 12-character cable code. To order, specify the cable code (described below)

and the required cable length. Cable length, by default, is specified in feet. The general format and description of the code is as shown below:

Fiber Type*	Cable Code			Notes
	Lightpack Core			
	Metallic	Dielectric	Rodent-Lightning	
Single-Mode (SM) AllWave™	ADXS-NNN-BXC ADXS-NNN-BXD	ADNX-NNN-BXC ADNX-NNN-BXD	ADRX-NNN-BXC ADRX-NNN-BXD	BXC = 0.35/0.25 dB/km at 1310/1550 nm BXD = 0.40/0.30 dB/km at 1310/1550 nm
Single-Mode (SM) Matched Cladding	7DSX-NNN-BXC 7DSX-NNN-BXD	7DNX-NNN-BXC 7DNX-NNN-BXD	7DRX-NNN-BXC 7DRX-NNN-BXD	AllWave™ Fiber (BXC & BXD) $\leq .35$ dB/km at 1385 nm
62.5µm Multimode(MM)	3DSX-NNN-HXM	3DNX-NNN-HXM	3DRX-NNN-HXM	HXM = 3.4 dB/km 200 MHz-km at 850 nm
Fiber Type*	AccuRibbon Core			
	Metallic	Dielectric	Rodent-Lightning	
Single-Mode (SM) AllWave™	AGSX-NNN-BXC AGSX-NNN-BXD	AGNX-NNN-BXC AGNX-NNN-BXD	AGRX-NNN-BXC AGRX-NNN-BXD	1.0 dB/km 500 MHz-km at 1300 nm
Single-Mode Matched Cladding	7GSX-NNN-BXC 7GSX-NNN-BXD	7GNX-NNN-BXC 7GNX-NNN-BXD	7GRX-NNN-BXC 7GRX-NNN-BXD	NNN = Number of Fibers
62.5µm Multimode(MM)	3GSX-NNN-HXM	3GNX-NNN-HXM	3GRX-NNN-HXM	004-096 (Lightpack) 012-216 (AccuRibbon)

\* A 16-character code is required for RUS requested cable – simply add “RUS” to the above codes. Available fiber types are Single-Mode Matched Clad, Multimode, AllWave™, and TrueWave® fiber. Other fiber counts, other transmission characteristics and fiber type combinations are available on a special order basis.

## LXE Fiber Optic Cable — The Reliable Solution for Fiber Optic Networks

With Lucent Technologies LXE Fiber Optic Cable, your worries about installation abuse and environmental hazards are a thing of the past. With two core options and three sheath options to choose from, you can select a cable configuration that is exactly right for your application. The compact

design and high strength-to-weight ratio of the cable make installation easy — particularly in limited duct space. Craft productivity is also maximized by the easy access to all fibers provided by the central core tube design, and the benefits of mass fusion splicing of fiber ribbons. In addition to these improved fiber administration features, the LXE Fiber Optic Cable provides excellent optical, mechanical, and environmental performance. Count on Lucent Technologies for solutions that work.

For additional information about this and other Lucent Technologies Inc. products and services, please contact your Lucent Technologies Sales Representative.

Visit our web site at <http://www.lucent.com>

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