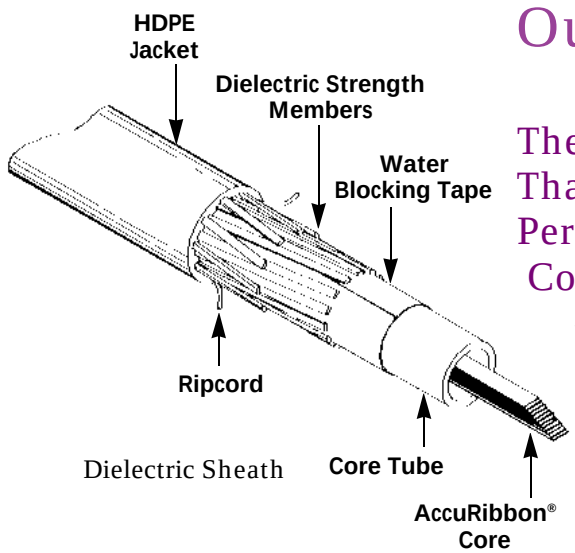
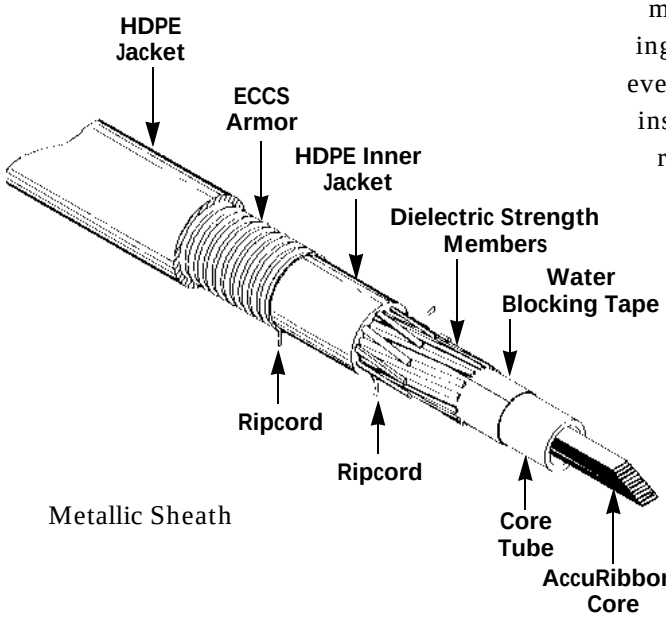
Lucent Technologies
Bell Labs Innovations

AccuRibbon® DuctSaver Cable

The Cost-Effective Solution for Maximizing Fiber Density in Outside Plant Environments



Dielectric Sheath



Metallic Sheath

The Cabling Solution That Optimizes Performance and Cost-Effectiveness

You're used to the cable your company has always utilized in outside plant applications.

It may not be the most compact cable, and it may not be ideally suited to mid-span entry in branching applications. It may even cost a premium to install, since you could require a second cable in the duct (assuming two will fit!) to furnish all the fibers you need. Nonetheless, it's adequate, so why switch?

AccuRibbon DuctSaver Cable is now available from Lucent Technologies… that's why.

AccuRibbon DuctSaver Cable is nothing less than the next generation in ribbon cable designs for use in outside plant applications. You will realize an array of benefits by choosing AccuRibbon cable, many of which will directly impact your bottom line. Benefits include obtaining optimal use of duct space, reduced installation time and cost, and enhanced craft productivity.

Bell Laboratories ingenuity has resulted in a cable solution that packs up to 432 fibers in a highly compact size—the highest fiber density per cross sectional cable area available from the Industry.

Put Simply…The Best Cable Solution For Tight Spaces

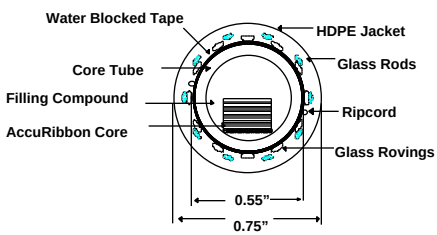
Our dielectric sheath, measuring a mere 0.75 inches, can be installed in a 1-inch innerduct, while our metallic sheath version, just 0.89 inches across, can be installed in a 1.25-inch innerduct (Indeed, our metallic sheath is often more compact than most competitors' dielectric designs).

Such a compact size makes it the perfect cable solution for areas requiring high fiber counts where duct space is at a premium. It will easily withstand standard installation procedures in aerial, buried, and underground environments. And, as you would expect from Lucent Technologies, its mechanical, optical, and environmental performance are outstanding.

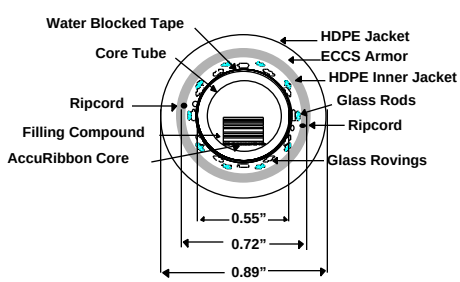
A Cable Made For Mass Fusion Splicing

In addition to the installation advantages provided by the high fiber density and compact size, AccuRibbon DuctSaver Cable provides improved splicing productivity and ease. Its rugged ribbons contain 24 fibers—a unique, ingenious ribbon design. These ribbons can easily be divided into two, robust 12-fiber sub-units, and mass fusion spliced. Mass fusion splicing of 12-fiber units can improve splicing productivity (over single-fiber splicing) by a factor of 4 to 1, and thus reduce installation costs by a factor of 2 to 1. Further, cable end and mid-span entry is simplified. The number of ribbons is minimized, and all fibers are accessible once the sheath is removed. In addition, routing within fiber closures is simplified by the use of eighteen 24-fiber AccuRibbon units (in a central core cable) compared to thirty-six 12-fiber ribbon units (in non-central core designs), particularly at midspan breakouts. This optimizes slack fiber storage in the confines of your closures.

Reliable, Industry Proven Central Core Tube Design



Dielectric Sheath



Metallic Sheath

How is it all possible? Our Central Core Tube technology places all the fibers in one easily accessible core tube, providing the maximum fiber density relative to cable diameter. The DuctSaver sheath consists of a helical application of a layer of glass strength members over which a second layer of reinforced glass strength elements is applied, in the opposite direction. A sufficient number of strength elements are utilized in order to provide a 600 lb. tensile load rating. The sheath is then coated with a black high density polyethylene (HDPE) jacket. Two ripcords, opposite from each other among the outer layer of strength members, are added to aid in the removal of the outer jacket. An optional armor of Electrolytic Chrome Coated Steel (ECCS) is provided for applications requiring an armored design.

The Benefits of Choosing A Cable Solution Made By A World-Class Supplier

As the world's leading supplier of telecommunications equipment, Lucent Technologies has been providing world-class cable products for more than a century. You can depend on the engineers at our widely respected Bell Laboratories research unit for innovative cable solutions, and you can rest assured that all Lucent Technologies cable is manufactured at ISO-certified facilities.

AccuRibbon DuctSaver Cable Features at a Glance

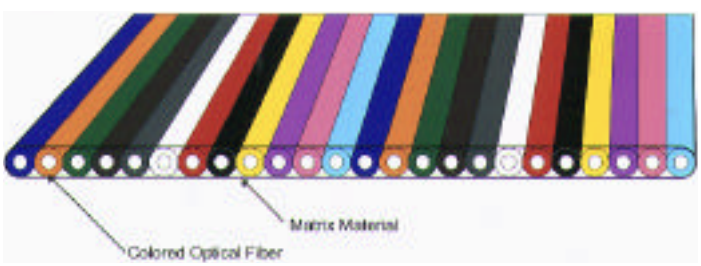
- Compact Size
- Rugged, robust design
- Multiple Sheath options
- Easy access to fibers
- Ideally suited to mass splicing techniques
- Lucent Technologies Single-Mode, and TrueWave® fibers with D-LUX® Coating

AccuRibbon DuctSaver Cable Benefits to the Customer

- Highest fiber density per cross-sectional cable area
- Optimal use of duct space
  - Dielectric Cable can be installed in 1-inch innerduct
  - Metallic Cable can be installed in 1.25-inch innerduct
- Reduced installation time and cost for optimal fiber density
- Excellent optical, mechanical, and environmental performance
- Proven, reliable network performance
- Optimized craft productivity
- Most effective, efficient storage of slack ribbons

AccuRibbon Unit Design

AccuRibbon units in the cable contain 24 fibers per ribbon. The maximum number of ribbons is 18, for a maximum of 432 fibers in the cable. The units are stacked in a rectangular array and given a controlled twist to minimize stress when the cable is bent. Each unit is a flat array of colored fibers bonded by a UV light-curable matrix material as shown in the following figure:



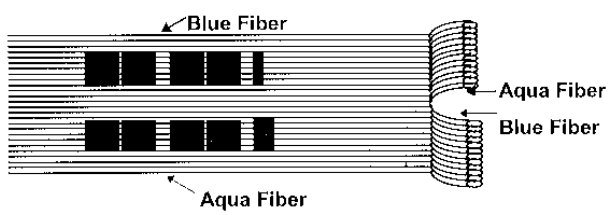
Fiber Color Code

All fibers used in AccuRibbon units are color coded to facilitate individual fiber identification. The individual fiber colors used in 24-fiber AccuRibbon units are given in the following table.

Fiber No.	Fiber Color	Fiber No.	Fiber Color
1	Blue (BL)	13	Blue (BL)
2	Orange (OR)	14	Orange (OR)
3	Green (GR)	15	Green (GR)
4	Brown (BR)	16	Brown (BR)
5	Slate (SL)	17	Slate (SL)
6	White (WH)	18	White (WH)
7	Red (RD)	19	Red (RD)
8	Black (BK)	20	Black (BK)
9	Yellow (YL)	21	Yellow (YL)
10	Violet (VI)	22	Violet (VI)
11	Rose (RS)	23	Rose (RS)
12	Aqua (AQ)	24	Aqua (AQ)

AccuRibbon Unit Identification and Fiber Orientation

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. The identification marks on 24-fiber ribbons consist of vertical bar and “box” marks, as shown in the following figure.



24-Fiber AccuRibbon Locator Guide

24-fiber ribbons are marked as two 12-fiber sub-units. A “box” is used to code groups of five. The ribbon number can be easily identified by taking the even sub-unit number and dividing by 2. For example, if the ribbon sub-units are identified as 17-■■■|| and 18-■■■|||, the marking corresponds to sub-units 17 and 18. If you divide the even sub-unit number by 2 (in this case 18/2), this means that you are working with ribbon 9. The following table provides the ribbon marking details:

Ribbon Number	Sub-Unit Number	Ribbon Marking	Fiber Color and Number											
			BL	OR	GR	BR	SL	WH	RD	BK	YL	VI	RS	AQ
1	1	1-|	1	2	3	4	5	6	7	8	9	10	11	12
	2	2-||	13	14	15	16	17	18	19	20	21	22	23	24
2	3	3-|||	25	26	27	28	29	30	31	32	33	34	35	36
	4	4-||||	37	38	39	40	41	42	43	44	45	46	47	48
3	5	5-■	49	50	51	52	53	54	55	56	57	58	59	60
	6	6-■|	61	62	63	64	65	66	67	68	69	70	71	72
4	7	7-■||	73	74	75	76	77	78	79	80	81	82	83	84
	8	8-■|||	85	86	87	88	89	90	91	92	93	94	95	96
5	9	9-■||||	97	98	99	100	101	102	103	104	105	106	107	108
	10	10-■■	109	110	111	112	113	114	115	116	117	118	119	120
6	11	11-■■|	121	122	123	124	125	126	127	128	129	130	131	132
	12	12-■■||	133	134	135	136	137	138	139	140	141	142	143	144
7	13	13-■■|||	145	146	147	148	149	150	151	152	153	154	155	156
	14	14-■■||||	157	158	159	160	161	162	163	164	165	166	167	168
8	15	15-■■■	169	170	171	172	173	174	175	176	177	178	179	180
	16	16-■■■|	181	182	183	184	185	186	187	188	189	190	191	192
9	17	17-■■■||	193	194	195	196	197	198	199	200	201	202	203	204
	18	18-■■■|||	205	206	207	208	209	210	211	212	213	214	215	216
10	19	19-■■■||||	217	218	219	220	221	222	223	224	225	226	227	228
	20	20-■■■■	229	230	231	232	233	234	235	236	237	238	239	240
11	21	21-■■■■|	241	242	243	244	245	246	247	248	249	250	251	252
	22	22-■■■■||	253	254	255	256	257	258	259	260	261	262	263	264
12	23	23-■■■■|||	265	266	267	268	269	270	271	272	273	274	275	276
	24	24-■■■■||||	277	278	279	280	281	282	283	284	285	286	287	288
13	25	25-■■■■■	289	290	291	292	293	294	295	296	297	298	299	300
	26	26-■■■■■|	301	302	303	304	305	306	307	308	309	310	311	312
14	27	27-■■■■■||	313	314	315	316	317	318	319	320	321	322	323	324
	28	28-■■■■■|||	325	326	327	328	329	330	331	332	333	334	335	336
15	29	29-■■■■■||||	337	338	339	340	341	342	343	344	345	346	347	348
	30	30-■■■■■■	349	350	351	352	353	354	355	356	357	358	359	360
16	31	31-■■■■■■|	361	362	363	364	365	366	367	368	369	370	371	372
	32	32-■■■■■■||	373	374	375	376	377	378	379	380	381	382	383	384
17	33	33-■■■■■■|||	385	386	387	388	389	390	391	392	393	394	395	396
	34	34-■■■■■■||||	397	398	399	400	401	402	403	404	405	406	407	408
18	35	35-■■■■■■■	409	410	411	412	413	414	415	416	417	418	419	420
	36	36-■■■■■■■|	421	422	423	424	425	426	427	428	429	430	431	432

Cable Diameters, Mass, and Maximum Length

Sheath Type	Fiber Count	Cable OD	Cable Mass	Maximum Length
Metallic Armored	288, 360, 432	0.89 in. (22.6 mm)	294 lbs/kft (438 kg/km)	19,685 ft (6 km)
Dielectric	288, 360, 432	0.75 in. (19.0 mm)	190 lbs/kft (283 kg/km)	19,685 ft (6 km)

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

Cable Test	Test Method	Requirement
Tensile Loading and Bending	EIA/TIA-455-33 IEC 794-1-E1	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
Cyclic Flexing	TIA/EIA-455-104 IEC 794-1-E6	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
Cyclic Impact	EIA/TIA-455-25 IEC 794-1-E4	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
Compressive Loading	TIA/EIA-455-41 IEC 794-1-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 794-1-E7	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
Low and High Temperature Bend	EIA/TIA-455-37 IEC 794-1-E11	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
External Freezing	EIA/TIA-455-98 IEC 794-1-F6	90% < 0.05 dB Max. Added Loss 100% < 0.15 dB Max. Added Loss
Fiber Strippability	EIA/TIA-455-178 No equivalent IEC procedure	≤8.9 N (2 lbf) on unaged and aged fiber ≥1.3N (0.3 lbf) on unaged and aged fiber
Temperature Cycling	EIA/TIA-455-3 IEC 794-1-F1	≤0.05 dB/km Mean Added Loss ≥0.15 dB/km Max Added Loss
Cable Aging	EIA/TIA-455-3 IEC 794-1-F1	≤0.10 dB/km Mean Added Loss 0.25 dB/km Max Added Loss
Water Penetration	EIA/TIA-455-82 IEC 794-1-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	EIA/TIA-455-81 IEC 794-1-E14	80°C, 24 hours duration, no drip
Lightning Conduction	TIA/EIA-455-181	Bellcore Category I for all armored metallic sheaths

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

Ordering Information

Lucent Technologies AccuRibbon DuctSaver Cables may be custom ordered up to 19,685 ft (6 km) lengths. Please specify the particular sheath design, fiber count, and transmission parameter by the 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 available ordering codes are as follows:

	Metallic Sheath		
	Cable Code	**COMCODE**	**Notes**
Single-Mode (SM) Depressed Cladding	4RYD-288-BXD 4RYD-360-BXD 4RYD-432-BXD	107990236 107990244 107990251	BXD = 0.4/0.3 dB/km at 1310/1550 nm
	Dielectric Sheath		Other Fiber Types and transmission parameters may be ordered on a special basis
	Cable Code	**COMCODE**	
Single-Mode (SM) Depressed Cladding	4RFX-288-BXD 4RFX-360-BXD 4RFX-432-BXD	107990269 107990277 107990285	

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

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