

SUMITOMO RECOMMENDED PROCEDURE

SRP SP-F02-063

Freeform Ribbon® Outdoor/Indoor LSZH OFCR Steel Armored Ribbon Cable Preparation

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1.0 General

This procedure describes the standard techniques for preparing LSZH Freeform Armored Ribbon fiber optic cable for placing and use in splice or termination shelves. This product utilizes a single central buffer tube designed to accommodate up to 1728 fibers using 12 fiber Freeform Ribbons®. The tube is protected by a corrugated steel armor. Two steel wires are longitudinally laid 180° apart along the armor to provide tensile strength. A LSZH jacket covers this core.

2.0 Safety Precautions

2.1 The use of safety equipment is strongly recommended during the cable preparation procedure. This includes the use of protective clothing and eyewear.

2.2 To protect the hands, gloves are recommended when handling the steel armor.

3.0 Reference Documents

SP-F01-002 Installing Cable Pulling Grip

SP-F01-002A Grip Addendum for Ribbon Cables

4.0 Tools Required

The following tools and materials are required to complete this procedure.

1. Tape Measure
2. Utility Knife
3. Diagonal Cutter Pliers
4. Electrician's Scissors
5. Marking Pen
6. Needle Nose Pliers
7. Gloves
8. Safety Glasses
9. UCTS-001 Universal Central Tube Slitter
10. Ripley's RCS-114 or RCS-158 Cable Stripper

5.0 Sheath Removal

5.1 End Access

This procedure involves opening a window in the sheath at the desired distance from the cable end, exposing the central tube, ring cutting the central tube and then sliding the tube, strength elements and jacket off to expose the optical fiber ribbons. Refer to step by step instructions below.

5.1.1 Measure and mark the appropriate length of cable to be cleaned back for the particular application (splicing: typically 8 feet).

5.1.2 Using the Ripley's RCS-114 or RCS-158 Cable Stripper, ring cut the jacket once at the mark and again approximately 12 inches towards the cable end.

5.1.3 Using a sharp utility knife, shave off the jacket material over the two wires between the two ring cuts. Using pliers, remove the remaining jacket between the two ring cuts.

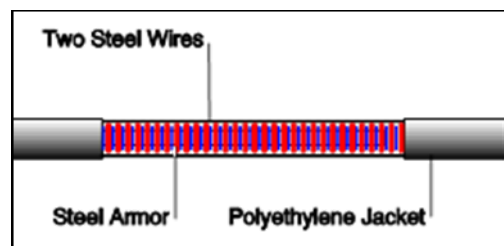


Figure 1

5.1.4 Midway along the exposed area, cut both steel wires with diagonal cutter pliers. Be sure to leave enough wire on the inside end for grounding or pulling eye attachment (refer to appropriate procedures for necessary lengths). Bend back the wires to expose the corrugated armor.

5.1.5 Open a window in the steel armor by opening the steel tape overlap and making a radial cut on the armor edge with shears and peeling it off with needle nose pliers. This will expose the ripcords underneath the armor.

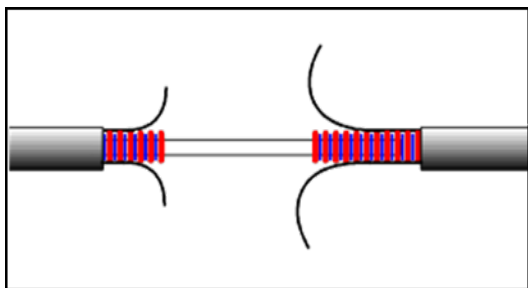


Figure 2

NOTE: For most pulling eye installations, the armor, tube and fibers can be cut away leaving only the two steel wires for attachment. Follow procedures for pulling eye attachments.

5.7 Scrape off the plastic coating on the steel armor with a utility knife. This will allow for proper grounding connections.

5.8 If local grounding practices require, make a small cut in the armor adjacent to the ripcord and slit approximately 1 to 1.5 inches of the armor to provide a grounding access.

5.9 Cut away the excess ripcord.

5.10 Using the UCTS-001 tool or a standard buffer tube remover, ring cut the central tube leaving the appropriate length at the cable end (typically 2-4 inches). Score the tube, cutting ~3/4 of the way through the plastic. Avoid cutting completely through the plastic as this may damage the fibers. Bend the tube gently at the score to cleanly separate the tube.

5.11 Carefully slide the tube, armor, wires and jacket off to expose the optical fibers.

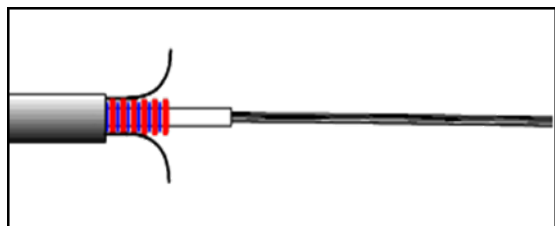


Figure 3

5.2 Mid-Span Access

5.2.1 Measure and mark the appropriate length (typically 8 feet) of the window to be opened in the cable for the particular application.

5.2.2 Using the Ripley's RCS-114 or RCS-158 Cable Stripper, ring cut the jacket at both marks and once more approximately 6 inches from one of the marks. Take care in not cutting too deeply for this may damage either the ripcords or central buffer tube below.

5.2.3 Using a sharp utility knife, shave off the jacket material over the two wires between the two ring cuts. Using pliers, remove the remaining jacket between the two ring cuts.

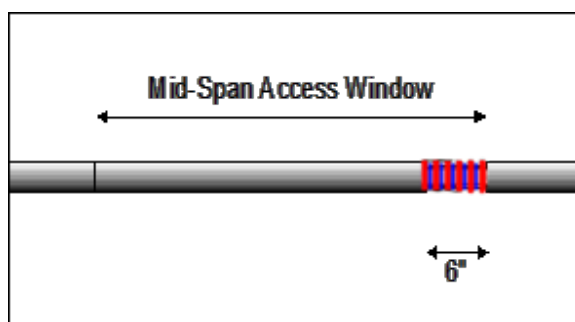


Figure 4

5.2.4 Using a blunt edged object such as the needle nose pliers, grab each ripcord located along the strength elements and slit open the remainder of the jacket between the two marks.

NOTE: Sometimes providing a notch in the jacket edge with the utility knife will help the ripcord get started. Remove the jacket between the two ring cuts.

5.2.5 Cut the steel strength elements at both ends of the window with the diagonal cutter pliers. If necessary, leave enough length for anchoring the cable within a splice closure or termination box (typically 6 inches).

5.2.6 Cut the armor layer at both ends of the opened window and remove it to expose the tube underneath.

5.2.7 Choose appropriate UCTS-001 blade setting based on tube size below according to Table 1.

Fiber Count	ID/OD (mm)	Tube Slitter
48	6.6/8.0	UCTS-001 Dial Setting 2.05 Small Slitting Channel
144	6.6/8.0	UCTS-001 Dial Setting 2.05 Small Slitting Channel
432	10.4/11.8	UCTS-001 Dial Setting 2.25 Small Slitting Channel
1728	17.5/18.7	UCTS-001 Dial Setting 1.25 Large Slitting Channel

Table 1

5.2.8 Adjust slitter's blade depth with supplied instructions. If the blades fully penetrate the tube wall, there is a chance of damaging the ribbon fibers. The correct dial gauge sets the blades' depth for the exact wall thickness.

NOTE: Always reset blade depth back to "0" setting when changing tube sizes. Always make a test cut before proceeding.

5.2.9 Make a longitudinal cut in buffer tube with slitter. Make sure to hold steady pressure on the UCTS tool to ensure that the tube is properly cut.

5.2.10 Carefully snip away both tube halves. An additional ring cut with the UCTS tool can be made to obtain a smoother end.

5.2.11 The 12 fiber ribbons are now exposed and ready for mass splicing.

6.0 Fiber Unit Identification

6.1 Each ribbon contains individually color coded fibers that are held together by a pliable matrix encapsulate. Each ribbon has a unique marking code to provide unit identification.

FIBER COLOR CODE	
FIBER #	COLOR
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose
12	Aqua

See ribbon marking codes in **Tables 2 - 5** on pages 5 – 9.

**432 Fiber count – Bundle Units 1-6

1728 Fiber Count – Bundle Units 1-24

UNIT #	RIB #	<i>RIBBON MARKING - 72F BOUND UNITS</i>	
		BUNDLE	MARKING
1	1	Blue Binder	1 bar
	2	Blue Binder	2 bars
	3	Blue Binder	3 bars
	4	Blue Binder	4 bars
	5	Blue Binder	1 Short Block
	6	Blue Binder	1 Short Block + 1 bar
2	7	Blue Binder	1 Short Block + 2 bars
	8	Blue Binder	1 Short Block + 3 bars
	9	Blue Binder	1 Short Block + 4 bars
	10	Blue Binder	1 Long Block
	11	Blue Binder	1 Long Block + 1 bar
	12	Blue Binder	1 Long Block + 2 bars
3	13	Blue Binder	1 Long Block + 3 bars
	14	Blue Binder	1 Long Block + 4 bars
	15	Blue Binder	1 Long Block + 1 Short Block
	16	Blue Binder	1 Long Block + 1 Short Block + 1 bar
	17	Blue Binder	1 Long Block + 1 Short Block + 2 bars
	18	Blue Binder	1 Long Block + 1 Short Block + 3 bars
4	19	Blue Binder	1 Long Block + 1 Short Block + 4 bars
	20	Blue Binder	2 Long Blocks
	21	Blue Binder	2 Long Blocks + 1 bar
	22	Blue Binder	2 Long Blocks + 2 bars
	23	Blue Binder	2 Long Blocks + 3 bars
	24	Blue Binder	2 Long Blocks + 4 bars
5	25	Blue Binder	2 Long Blocks + 1 Short Block
	26	Blue Binder	2 Long Blocks + 1 Short Block + 1 bar
	27	Blue Binder	2 Long Blocks + 1 Short Block + 2 bars
	28	Blue Binder	2 Long Blocks + 1 Short Block + 3 bars
	29	Blue Binder	2 Long Blocks + 1 Short Block + 4 bars
	30	Blue Binder	3 Long Blocks
6	31	Blue Binder	3 Long Blocks + 1 bar
	32	Blue Binder	3 Long Blocks + 2 bars
	33	Blue Binder	3 Long Blocks + 3 bars
	34	Blue Binder	3 Long Blocks + 4 bars
	35	Blue Binder	3 Long Blocks + 1 Short Block
	36	Blue Binder	3 Long Blocks + 1 Short Block + 1 bar

Table 2

UNIT #	RIBBON MARKING - 72F BOUND UNITS		
	RIB #	BUNDLE	MARKING
7	37	Blue Binder	3 Long Blocks + 1 Short Block + 2 bars
	38	Blue Binder	3 Long Blocks + 1 Short Block + 3 bars
	39	Blue Binder	3 Long Blocks + 1 Short Block + 4 bars
	40	Blue Binder	4 Long Blocks
	41	Blue Binder	4 Long Blocks + 1 bar
	42	Blue Binder	4 Long Blocks + 2 bars
8	43	Blue Binder	4 Long Blocks + 3 bars
	44	Blue Binder	4 Long Blocks + 4 bars
	45	Blue Binder	4 Long Blocks + 1 Short Block
	46	Blue Binder	4 Long Blocks + 1 Short Block + 1 bar
	47	Blue Binder	4 Long Blocks + 1 Short Block + 2 bars
	48	Blue Binder	4 Long Blocks + 1 Short Block + 3 bars
9	49	Blue Binder	4 Long Blocks + 1 Short Block + 4 bars
	50	Blue Binder	1 Double Long Block
	51	Blue Binder	1 Double Long Block + 1 bar
	52	Blue Binder	1 Double Long Block + 2 bars
	53	Blue Binder	1 Double Long Block + 3 bars
	54	Blue Binder	1 Double Long Block + 4 bars
10	55	Blue Binder	1 Double Long Block + 1 Short Block
	56	Blue Binder	1 Double Long Block + 1 Short Block + 1 bar
	57	Blue Binder	1 Double Long Block + 1 Short Block + 2 bars
	58	Blue Binder	1 Double Long Block + 1 Short Block + 3 bars
	59	Blue Binder	1 Double Long Block + 1 Short Block + 4 bars
	60	Blue Binder	1 Double Long Block + 1 Long Block
11	61	Blue Binder	1 Double Long Block + 1 Long Block + 1 bar
	62	Blue Binder	1 Double Long Block + 1 Long Block + 2 bars
	63	Blue Binder	1 Double Long Block + 1 Long Block + 3 bars
	64	Blue Binder	1 Double Long Block + 1 Long Block + 4 bars
	65	Blue Binder	1 Double Long Block + 1 Long Block + 1 Short Block
	66	Blue Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 1 bar
12	67	Blue Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 2 bars
	68	Blue Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 3 bars
	69	Blue Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 4 bars
	70	Blue Binder	1 Double Long Block + 2 Long Blocks
	71	Blue Binder	1 Double Long Block + 2 Long Blocks + 1 bar
	72	Blue Binder	1 Double Long Block + 2 Long Blocks + 2 bars

Table 3





<i>RIBBON MARKING - 72F BOUND UNITS</i>			
UNIT #	RIB #	BUNDLE	MARKING
13	73	Red Binder	1 bar
	74	Red Binder	2 bars
	75	Red Binder	3 bars
	76	Red Binder	4 bars
	77	Red Binder	1 Short Block
	78	Red Binder	1 Short Block + 1 bar
14	79	Red Binder	1 Short Block + 2 bars
	80	Red Binder	1 Short Block + 3 bars
	81	Red Binder	1 Short Block + 4 bars
	82	Red Binder	1 Long Block
	83	Red Binder	1 Long Block + 1 bar
	84	Red Binder	1 Long Block + 2 bars
15	85	Red Binder	1 Long Block + 3 bars
	86	Red Binder	1 Long Block + 4 bars
	87	Red Binder	1 Long Block + 1 Short Block
	88	Red Binder	1 Long Block + 1 Short Block + 1 bar
	89	Red Binder	1 Long Block + 1 Short Block + 2 bars
	90	Red Binder	1 Long Block + 1 Short Block + 3 bars
16	91	Red Binder	1 Long Block + 1 Short Block + 4 bars
	92	Red Binder	2 Long Blocks
	93	Red Binder	2 Long Blocks + 1 bar
	94	Red Binder	2 Long Blocks + 2 bars
	95	Red Binder	2 Long Blocks + 3 bars
	96	Red Binder	2 Long Blocks + 4 bars
17	97	Red Binder	2 Long Blocks + 1 Short Block
	98	Red Binder	2 Long Blocks + 1 Short Block + 1 bar
	99	Red Binder	2 Long Blocks + 1 Short Block + 2 bars
	100	Red Binder	2 Long Blocks + 1 Short Block + 3 bars
	101	Red Binder	2 Long Blocks + 1 Short Block + 4 bars
	102	Red Binder	3 Long Blocks
18	103	Red Binder	3 Long Blocks + 1 bar
	104	Red Binder	3 Long Blocks + 2 bars
	105	Red Binder	3 Long Blocks + 3 bars
	106	Red Binder	3 Long Blocks + 4 bars
	107	Red Binder	3 Long Blocks + 1 Short Block
	108	Red Binder	3 Long Blocks + 1 Short Block + 1 bar

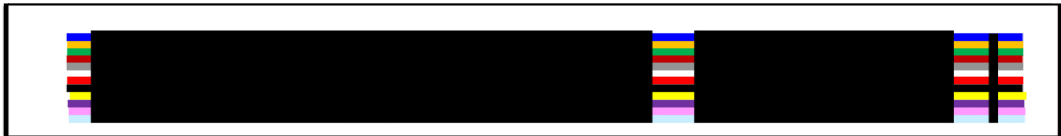
Table 4

RIBBON MARKING - 72F BOUND UNITS			
UNIT #	RIB #	BUNDLE	MARKING
19	109	Red Binder	3 Long Blocks + 1 Short Block + 2 bars
	110	Red Binder	3 Long Blocks + 1 Short Block + 3 bars
	111	Red Binder	3 Long Blocks + 1 Short Block + 4 bars
	112	Red Binder	4 Long Blocks
	113	Red Binder	4 Long Blocks + 1 bar
	114	Red Binder	4 Long Blocks + 2 bars
20	115	Red Binder	4 Long Blocks + 3 bars
	116	Red Binder	4 Long Blocks + 4 bars
	117	Red Binder	4 Long Blocks + 1 Short Block
	118	Red Binder	4 Long Blocks + 1 Short Block + 1 bar
	119	Red Binder	4 Long Blocks + 1 Short Block + 2 bars
	120	Red Binder	4 Long Blocks + 1 Short Block + 3 bars
21	121	Red Binder	4 Long Blocks + 1 Short Block + 4 bars
	122	Red Binder	1 Double Long Block
	123	Red Binder	1 Double Long Block + 1 bar
	124	Red Binder	1 Double Long Block + 2 bars
	125	Red Binder	1 Double Long Block + 3 bars
	126	Red Binder	1 Double Long Block + 4 bars
22	127	Red Binder	1 Double Long Block + 1 Short Block
	128	Red Binder	1 Double Long Block + 1 Short Block + 1 bar
	129	Red Binder	1 Double Long Block + 1 Short Block + 2 bars
	130	Red Binder	1 Double Long Block + 1 Short Block + 3 bars
	131	Red Binder	1 Double Long Block + 1 Short Block + 4 bars
	132	Red Binder	1 Double Long Block + 1 Long Block
23	133	Red Binder	1 Double Long Block + 1 Long Block + 1 bar
	134	Red Binder	1 Double Long Block + 1 Long Block + 2 bars
	135	Red Binder	1 Double Long Block + 1 Long Block + 3 bars
	136	Red Binder	1 Double Long Block + 1 Long Block + 4 bars
	137	Red Binder	1 Double Long Block + 1 Long Block + 1 Short Block
	138	Red Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 1 bar
24	139	Red Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 2 bars
	140	Red Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 3 bars
	141	Red Binder	1 Double Long Block + 1 Long Block + 1 Short Block + 4 bars
	142	Red Binder	1 Double Long Block + 2 Long Blocks
	143	Red Binder	1 Double Long Block + 2 Long Blocks + 1 bar
	144	Red Binder	1 Double Long Block + 2 Long Blocks + 2 bars

Table 5

Marking Pattern

<i>1</i>	<i>5</i>	<i>10</i>	<i>50</i>
 <i>Bar</i>	 <i>"Short" Block</i>	 <i>"Long Block"</i>	 <i>"Double Long Block"</i>



The Above Designates Ribbon #61 (1 Double Long Block, 1 Long Block, 1 Bar)