

ELMEC MANUFACTURING SPECIFICATION
REVISION DATE 10/11/05

SPECIFICATION NUMBER : EMS02
 SPECIFICATION TITLE: FLEXIBLE JUMPERS

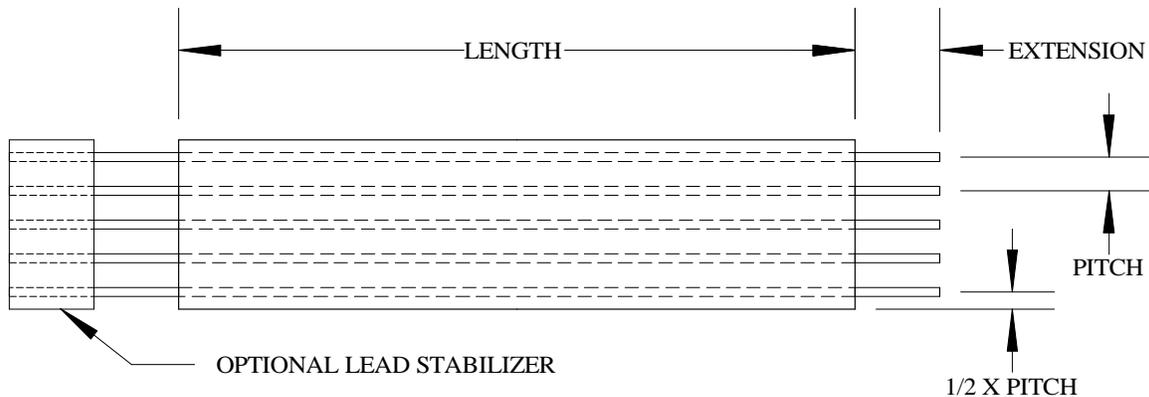
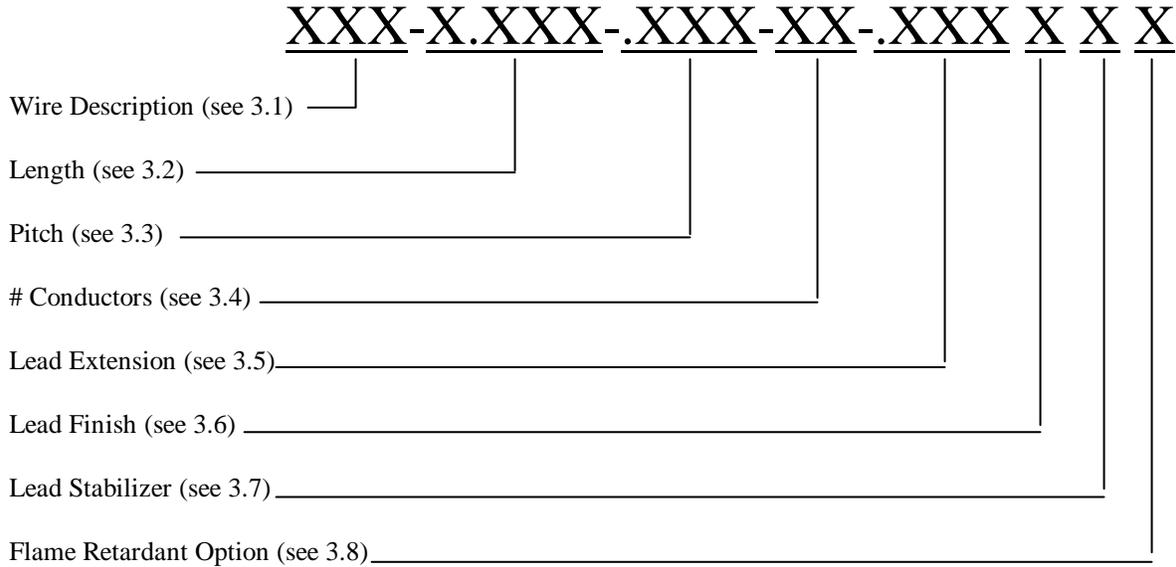
1.0 Scope

This specification is a technical description of Elmec *standard flexible jumpers*. It is recommended that the parts be specified within the limits of this specification. These will be considered as 'standard' Elmec parts and will have the best possible price and delivery. Customizing beyond the limits of this specification may result in increased price, extended delivery, and/or reduced producibility.

2.0 Applicable Documents

- ASTM-B170 Copper
- EMS01 Bare Copper Wire
- IPC-FC-232C/1 Adhesive Coated Dielectric Films for use as Cover Sheets for Flexible Printed Wiring
- IPC-FC-232C/18 Acrylic Adhesive

3.0 Part Numbering and Description



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3.1 Wire Description

The standard conductor material is copper wire, Oxygen Free High Conductivity (OFHC), 99.95% minimum purity per ASTM-B170. The wire is available in three forms - solid(round), stranded, or flat (ribbon). Standard wire for Elmec Flexible Jumpers are:

3.1.1 Round Wire (followed by gauge, AWG) ex. R26 = 26AWG round wire

- R22 = .0253 Dia.
- R24 = .0201 Dia.
- R26 = .0159 Dia.
- R28 = .0126 Dia.
- R30 = .0100 Dia.
- R32 = .0080 Dia.

Tolerance of round wires is +/- .0002 Dia.

3.1.2 Stranded Wire (followed by gauge, AWG) ex. S26 = 26 AWG stranded wire. Refer to EMS01 for Qty and gauge of strands.

- S26 = .021 Dia.
- S28 = .016 Dia.
- S30 = .012 Dia.
- S32 = .010 Dia.

Diameters are rough values. Stranded wires may not always bunch in a round configuration, they may flatten out somewhat during processing. The hole size in mating assemblies should allow for this.

3.1.3 Flat Wire (followed by gauge, AWG) ex. F26 = 26AWG flat wire.

- F24 = .005 in. X .063 in.
- F26 = .003 in. X .062 in.
- F28 = .003 in. X .042 in.
- F30 = .003 in. X .026 in.
- F32 = .002 in. X .025 in.

Tolerance is ±.0005 Thickness and ±.001 width.

For wire materials and dimensions not listed, consult Elmec.

3.1.4 Selecting Wire Gauge

If a large wire is used with a relatively small pitch, the jumper will required additional adhesive. This makes the part less flexible and more costly. If possible the following guidelines should be followed.

Preferred Wire Gauge vs. Pitch

	PITCH					
	.019 to .024	.025 to .049	.050 to .074	.075 to .099	.100 to .149	.150 to .208
R22						X
R24, S26					X	X
R26, F24, F26, S28				X	X	X
R28, R30, S30, F28, F30, F32			X	X	X	X
S32		X	X	X	X	X
R32	X	X	X	X	X	X

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3.2 Length

The insulation material is Polyimide H film per IPC-FC-232C/1 Class 3 with acrylic adhesive per IPC-FC-232C/18 Class 3. The standard length is .150 inch to 16.500 inch. The standard tolerance are as follows:

6 inches and less $\pm .02$ inch

more than 6 inches $\pm .05$ inch

Length is measured from one outside edge of the Polyimide to the other outside edge. Misalignment of the Polyimide is in accordance with section 4.6. Consult Elmec when tighter tolerances or non-standard lengths are required.

3.3 Pitch

The pitch between conductor centers is considered standard provided it is between .019 and .208. Tolerance of conductor pitch is as follows:

For pitch between .019 and .049 - Standard tolerance is $\pm .005$ non-accum.

For pitch between .050 and .124 - Standard tolerance is $\pm .010$ non-accum.

For pitch between .125 and .208 - Standard tolerance is $\pm .015$ non-accum.

Consult Elmec when non-standard pitch or tighter pitch tolerances are required.

3.4 Conductor Quantity

Standard conductor quantities available are as follows:

For pitch between .019 and .049 - 1 to 75 conductors

For pitch between .050 and .074 - 1 to 70 conductors

For pitch between .075 and .100 - 1 to 60 conductors

For pitch between .101 and .208 - 1 to 40 conductors

For larger conductor counts, consult Elmec.

3.5 Extension

The extension of the lead out of the insulation may be .050 to .200 $\pm .015$ inch. For tighter tolerances, longer or shorter extension, or formed leads consult Elmec. In cases of misalignment of the Polyimide, the lead extension is measured from the outermost edge of the Polyimide to the end of the lead.

3.6 Lead Finish

T - solder coated with Sn63Pb37

X - Solder coated with Sn99.3Cu0.7 (RoHS Compatible, no lead)

B - Bare Copper, no coating. 'Bare' is not available for stranded wires.

For other lead finishes, consult Elmec.

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3.7 Lead Stabilizers

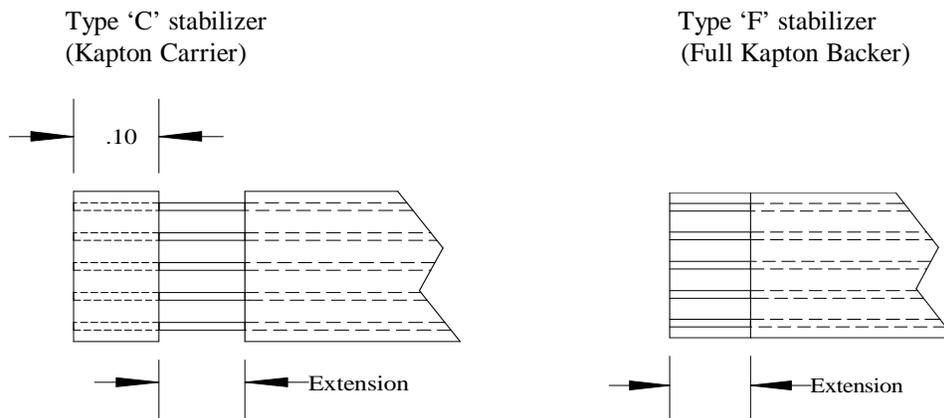
For small or fragile leads, Elmec can provide a means of stabilizing leads during shipment and assembly. There may be an additional cost for lead stabilizers.

There are three standard options for lead stabilizers:

N or *blank* - No lead stabilizer

C - .100 Polyimide carrier strips encapsulating the leads. Carrier strips cannot be removed without cutting wires.

F - Full Polyimide on backside of wires in the lead extension area. Unless otherwise specified by the customer, the leads will be exposed on the same side on both ends.



3.8 Flame Retardant Option

A flame retardant option is available which will allow the flexible jumper to meet UL94 V0.

blank - Polyimide insulator with standard acrylic adhesive.

R - Polyimide insulator with flame retardant acrylic adhesive.

4.0 Workmanship

The following workmanship is standard for all Elmec flexible jumpers. Additional requirements may be specified by the customer. Elmec Flex jumpers are inspected at 1X magnification. Defects may be classified at magnifications of 30 X maximum.

4.1 Lamination

It is preferred that no non-lamination exists between the base adhesive and the cover layer adhesive. Non-lamination is acceptable if it meets the following conditions:

1. The non-laminated area extends less than half of the distance between the traces.
2. There is no evidence of oil or other foreign materials that are causing the non-lamination.

4.2 Foreign Material

Foreign material that has been laminated inside the jumper is allowed if it meets the following conditions:

1. The foreign material has been classified as being non-conductive. It has a non-metallic color such as brown or black. If it is green, blue, silver, or gold in color it will be considered as conductive.
2. It is not visible at 1X magnification.
3. It does not bridge traces.

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4.3 Electrical Requirements

Testing of flex jumpers is not done unless required by the customer's purchase order.

4.4 Dimensional Requirements

4.4.1 Conductor to Edge

Distance from outer edge of conductor to edge of part - .005 inch minimum.

4.4.2 Thickness of Flexible Jumpers

The overall thickness of the flexible jumper measured in the thickest section shall be in the following range:

Maximum thickness = $t + .010$ inches

where 't' is the nominal thickness (or diameter) of the bare conductor in inches.

4.5 Solder Coated Leads

On flex Jumpers which have solder coated leads, the following is required:

1. Lead must be shiny in appearance.
2. Solder coverage must be uniform with no solder globs.
3. There shall be no brown or black residue from flux or the solder coating operation.
4. Solder coated leads should be free of flux (not sticky).
5. De-lamination which results from the solder coating operation is allowed as follows:
 - Wires .016 dia. and larger - .125 inch maximum from the lead/Polyimide interface.
 - Flat wires and wires smaller than .016 dia. - .050 in. max. from the lead/Polyimide interface.

4.6 Misc. Workmanship

1. Misalignment of Top/Bottom Polyimide layers shall be .020 inch maximum.
2. Bent leads - It is preferable that leads exiting the Polyimide be straight. It is allowable for leads to be bent in any direction, a maximum of 50% of the center to center spacing.
3. Damaged Leads:
 - Leads that have been creased are unacceptable.
 - Broken leads are unacceptable.
 - Flat leads that have been twisted are acceptable if they can be easily flattened at the assembly operation.
4. Adhesive Squeeze-out:
 - The amount of adhesive on the exposed lead shall be less than 25% of the exposed lead length. ex. - a .125 lead may have .031 in. squeeze-out max.