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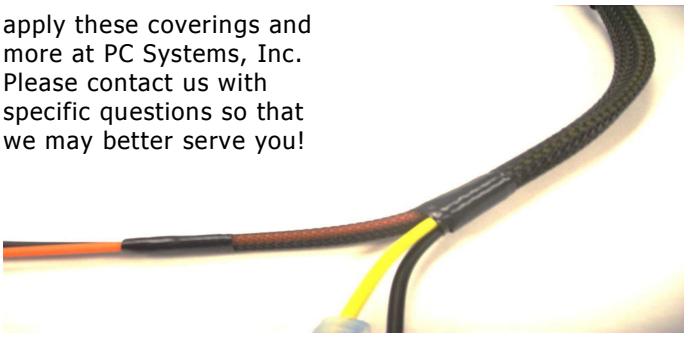
White Paper: Wire Harness Coverings

A Review of Your Options

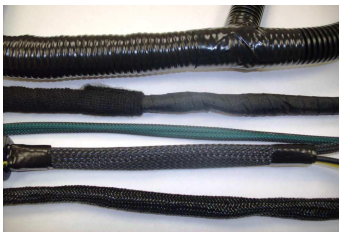
There are many options for providing protection for your wire harness. The application requirements must be balanced with budget to determine the most effective covering technique. Below is a table of common harness coverings as well as a qualitative comparison with regards to common requirements.

With this table, it is easy to identify the most important characteristics for your application and define which coverings best fit your needs.

We have the capability to apply these coverings and more at PC Systems, Inc. Please contact us with specific questions so that we may better serve you!



	Unit Cost (/ft)	Overall Cost	Ease of Installation	Abrasion Resistance	Sound Dampening	Independent Movement of Wires?	Color Options	Temperature Resistance	Reliability and Durability	Field Repair
Vinyl Tape	1	1	1	7	2	2	1	8	8	Y
Heatshrink (Polyolefin)	6	4	5	8	3	3	1	6	7	N
"No-shrink" PVC Tubing	4	3	6	3	6	6	2	7	6	N
Split Loom (Conduit)	3	2	4	4	7	7	2	5	4	Y
Non-split Loom (Conduit)	5	6	7	3	8	8	2	4	3	N
Expandable Sleeving	8	8	8	5	5	5	3	3	5	N
Technical Fabric Tape	7	7	2	2	1	1	3	2	2	Y
PVC Coated Nylon Braid	2	5	3	1	4	4	3	1	1	N
	1 - Lowest	*1 - Lowest*	*1 - Easiest*	*1 - Best*	*1 - Best*	*1 - Least*	*1 - Most*	*1 - Highest*	*1 - Highest*	*Y - Yes / N - No*



Cost: How does length affect it?

The length of your harness, or more specifically, the length of each "leg", should definitely be considered when choosing a harness covering. As we are aware, the raw material cost of most coverings is relatively low when compared to the labor cost of applying them.

From a cost standpoint, if a harness is long and straight and will be produced in batch sizes of greater than one, the obvious choice is PVC coated Nylon braid, although it may be counter-intuitive. The reason is that a single operator can run multiple braiding machines at once, dividing your labor cost. When the harness is short and requires constant manipulation in the machine, this is not possible.

At PCS, we use four feet as our benchmark. If the breakouts are over four feet, it is likely you will realize the benefits of this shared labor cost. If they are less than four feet, the relative numbers from the table above should be used.

That being said, although it may not be as cost effective, using braiding on harnesses with multiple breakouts is sometimes preferable due to the aesthetics it provides in the joints.

Technical Fabric Tapes: An alternative.

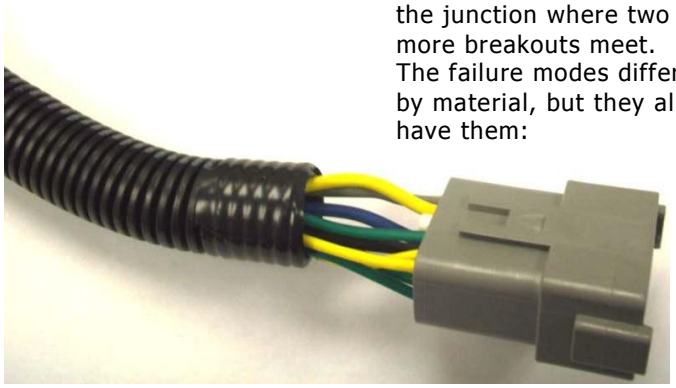
You have many options for wire harness coverings. If you need help choosing one, please call our Engineering team at 814-772-6359.

If you look under the hood of a European automobile, it is highly likely you'll see much of the harnessing wrapped in a fabric tape. This is in direct contrast to the USA, where you are likely to find corrugated loom or protective braids. There are strengths to both methods, but at PCS, we try to make sure lack of product exposure isn't the reason fabric tape is not selected on our harnesses.

Fabric tape can come in a variety of sizes and material configurations, depending on the application. These tapes are best suited for smaller lengths of harnesses (less than four feet) that have a specific application need. For example, heat resistance, noise dampening (anti-rattle), chemical resistance or abrasion resistance.

The installed cost is surprisingly comparable to braiding or loom. If you have specific questions on tape, please be sure to contact us!

Protecting the breakouts/joints?



Traditionally, one of the weakest links in the harness protection is at the junction where two or more breakouts meet. The failure modes differ by material, but they all have them:

Loom – Often these junctions are taped with common Vinyl tape. This tape is prone to chemical attack, adhesive failure, and unraveling. There are other options (as shown in the photo), but typically they are cost prohibitive.

Nylon Braid – The diameter of the harness often increases in the junction. This will have an effect on picks per inch, leading to exposed sections of the harness. Care needs to be taken in taping of the joints to eliminate this in the braiding process.

Tape – There are many methods to taping for full coverage in a junction, but the reality is that independent movement of each branch of the harness can lead to openings which can be a point of moisture or chemical ingress.

Using a supplier who is familiar with these failure modes will often lead to reduction of Quality problems. Also, conducting a formal risk assessment on the design (such as DFMEA) will define whether the selected materials are adequate for joint coverage.

We are happy to work with your team to make sure that you have the correct protection for your harness in your specified application.