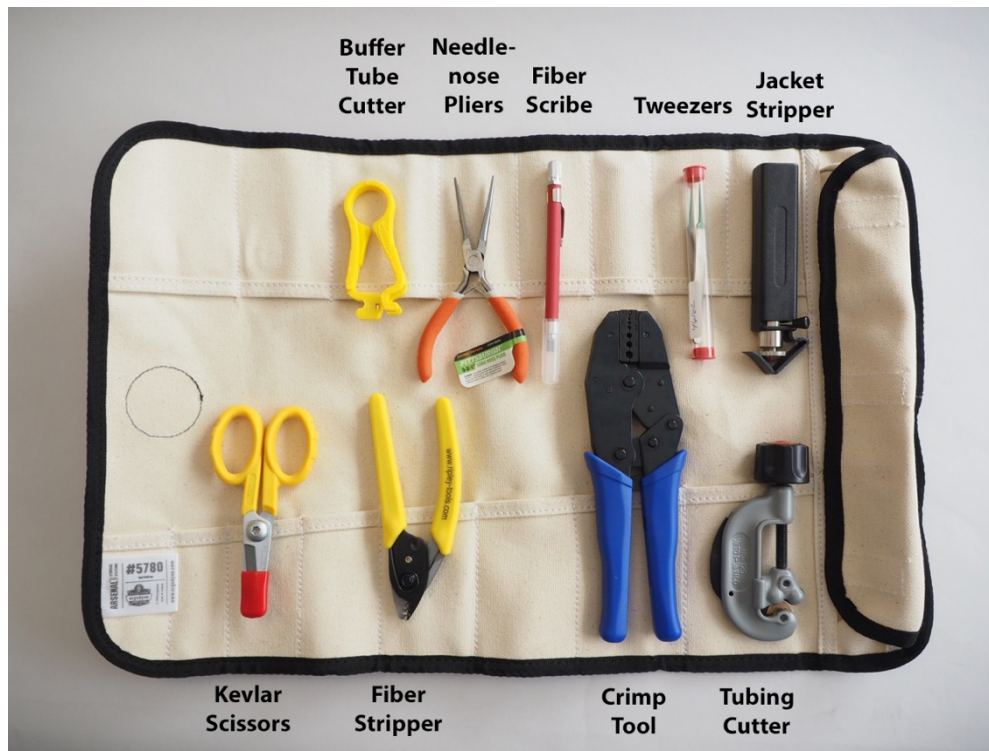


Fiber U Basic Skills Workbook

Tools

These are typical fiber optic technician’s tools recommended for the hands-on exercises in the workbook. In the following Workbook sections, we’ll show you how to use them. Fiber optic techs use other more common tools also, screwdrivers, pliers, cutters, drills, etc. which we assume you already know how to use. If you are not familiar with tools, take some time before you start these exercises learning how they are used, as that will help your learning how to use these specialized tools.

Read the final section of this workbook on Taking Care of Your Fiber Optic Tools.



Tools and Materials needed:

- Safety glasses
- Large jacket splitter and stripper
- Armored cable cutter (regular tubing cutter works well)
- Aramid yarn scissors
- Cable jacket stripper
- Fiber optic stripper (may be combined with cable jacket stripper)
- Needle nose pliers

Utility knife

Cable pulling eye, tape,

Sample cable types: simplex, zipcord, distribution, breakout, loose tube and armored, gel-filled loose tube

Large Jacket Slitter and Stripper



The Cable Slitter and Stripper can be used to cut and slit jacket on cable with an outside diameter of up to 2.75in. The blade is adjustable for jacket thickness. The blade can be turned 90 degrees for an axial cut, left in its normal position set for a round cut or changed to a 'in between' angle for a spiral cut. A spare blade is stored in the handle.

Small Cable Stripper And Buffer Tube Cutter



Loose tube cable buffer tube cutters from Ideal and Ripley/Miller

The ideal type is both a buffer tube cutter and lightweight cable jacket stripper which will make round or axial cuts on small cable jackets and buffer tubes quickly and easily. The adjustable blades can be set to the proper depth to assure nick-free strips.

The yellow Ripley/Miller stripper is just for buffer tubes. It is preset to score tubes for easy removal and may be an easier and safer tool to use for cutting buffer tubes.

There are other types of these tools that can be used to score and cut the tubes in loose tube cables to expose all the fibers.

Adjustable Jacket Stripper & Fiber Stripper

The adjustable jacket stripper strips and cuts various sizes of fiber optic cable jackets, primarily 3mm jacketed simplex cable or small distribution cable. It adjusts to fit different sized cable. All cutting surfaces are precision formed, hardened, tempered, and ground assuring clean, smooth strips. This cutter has been incorporated into most designs of fiber strippers that will strip simplex cable jackets of various size then strip the primary buffer coating from the fiber.

Fiber Optic Stripper

Visual Aid: Fiber Optic Stripping Tools (YouTube <http://youtu.be/EdGDklrPmH8>)



"Miller Stripper" (L) and Miller, No-Nik and Microstrip strippers

This Fiber Optic Stripper is used for buffer (primary buffer coating) removal without any scratching or nicking of the optical fiber. The stripper is designed for stripping 250 micron buffer coating from 125 micron optical fiber and or 900 micron "tight buffer" fiber. It is commonly called a "Miller Stripper" after the largest manufacturer. Other types of buffer strippers are the "No-Nik" (center) and "Micro Strip (right)."

This device strips the plastic buffer coating from the fiber. **Some people mistakenly believe it strips the cladding from the core - NOT SO - the core and cladding of SM and MM fibers are one solid piece of glass.** The only types of fiber that allow stripping cladding are rare PCS (plastic clad silica) fibers.

Needle Nose Pliers

Extra-long needle nose pliers are excellent for grabbing and pulling pullcords, or ripcords in large cables. Grab the pullcord firmly with the pliers, roll the cord around the jaws, and pull back along the cable to slit the cable open. Do not pull at 90 degrees to the cable. This will break the pullcord.

Aramid Yarn Scissors

Super-sharp scissors are specially made for cutting the tough aramid yarn (Kevlar fibers) used as strength members in fiber optic cable. Those fibers are made of the same material used in bullet proof vests. These scissors are made from hard stainless steel or ceramic to stand up to repeated use on Kevlar fibers. These scissors should be used only for cutting aramid yarn (Kevlar).

To use, bunch all the aramid yarn together, twist into a rope and cut all the fibers at once. The cutters should cut through in 1 to 2 snips.

Armored Cable Cutter



Armored cable has a metallic armor between two cable jackets. In order to remove the jackets, it is necessary to cut the armor. A standard plumbing tubing cutter can be used with larger diameter metallic-armored cables for cutting through both outside jacket and armor. The depth of the cutting blade is generally correct for cutting the outer jacket and armor without harming the inner jacket or fibers in a metallic-armored cable. Cut the armor just like metal tubing, making several revolutions around the cable, tightening the cutters with each revolution.

Other Tools And Equipment

Fusion splicers, termination tools, test equipment, etc. will be discussed in the sections where they will be used.

Taking Care of Your Fiber Optic Tools

Nothing is more frustrating than trying to accomplish a task and having problems with your tools. It doesn't matter whether it is not being able to find a tool or finding a damaged tool put back in the toolbox without being repaired or replaced, it is a problem.

Have you ever noticed how careful automobile mechanics are with their tools? The right tools are absolutely necessary for their work and they know they must keep them in good condition and stored in the tool's proper location when not being used. Tools are expensive - not just for mechanics but for fiber technicians too - so learn how to use

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them correctly and take care of them so they will work properly when you need them and last a long time.

Never, ever, go out on a job unless you have inspected your tools and test equipment back in the office and verified your tool kit is complete, your test equipment is working properly and you have all the supplies and consumables you need.

A corollary of this is never take new gear into the field until you have tested it in the office and are familiar enough with its use that you will not have problems in the field caused by unfamiliarity with it. When I was in the fiber optic test equipment business, it amazed us how many help calls we got from customers who were at the job site and wanted to know how to use the equipment!

Let's get more specific. Start with your tools. Clean off a table and open your fiber optic tool kit. Are all the tools there? Grab a notepad and list all of them including what you are missing. Create a list of tools you need and use it as a checklist so you don't forget anything. The Fiber U Basic Skills Lab online course had list of recommended tools you can use as a checklist. And keep a copy of that list in your toolkit for reference. (<https://fiberu.org/Basic%20Skills%20Lab/FO%20InstallersToolList.pdf>)

Some of your tools are bulletproof, but some are delicate and/or wear out. Check the condition of your fiber optic strippers and scribes in particular. They both should be carefully cleaned and inspected. Use a magnifying glass or loupe to check the working areas. Then get some fiber and test them to make sure they work properly. I recommend you have spares of these two tools in your kit since they do wear out or can be damaged, so spares are warranted.

Most test equipment is battery powered, so having spare batteries and/or keeping the batteries charged is important. Check the condition of the batteries in each piece of gear, turn it on and make sure it works properly. If your gear has adapters for various fiber optic connectors, make certain that all those adapters are there and kept in marked plastic bags to identify and protect them. Find all your reference test cables and mating adapters.

Grab one of your reference test cables and use it to check the operation of your connector inspection microscope. At the same time, you will be checking the condition of the reference cable connector. Does it look nice and clean and free from scratches? Reference test cables wear out after hundreds of tests, even when you clean them regularly, so use the microscope to check the condition of every connector on every reference cable and set aside those which look questionable.

Next use your light source and power meter to test all those reference cables. Use a single-ended insertion loss test to determine if they are still in good condition, with a loss of well under 0.5 dB, and discard the bad ones or set them aside for re-termination. If you have a checklist, keep track of the loss and watch how the loss will increase as

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they are used more and more. If you have an OTDR and associated launch cables for it also, use the light source and power meter to check them too.

Finally, check all your cleaning supplies. Make sure you have enough for the next job. If not, add that to your notepad list of things to order ASAP. Don't wait until the next job comes up; order all the replacement tools and supplies you need now and be ready.

Exercise

- Check your tools for completeness and condition.
- If you don't have a checklist of your tools, create one.
- Are all your battery powered equipment fully charged?