



Marine Systems Diploma Course

Tool and List Spring 2019

Dear Student,

Welcome to the Marine Systems program at the Northwest School of Wooden Boatbuilding. We have an exciting and busy time ahead of us, and the other instructors and I are looking forward to having you in our program. Before you arrive on campus, gathering a basic kit of good-quality tools is essential. As there are many different qualities and brands of tools out there, I'd like to share some thoughts and recommendations to help guide you through what can be an exciting, but confusing, process.

Remember that this class and your initial work will be broad. Additionally, people frequently find that their interests change during the course. This is a basic list of tools to get you started. Expect to specialize and upgrade your tool set as you move forward in your career.

Shop around, but be aware you get what you pay for. Research each tool and its use so you know what you are buying. Also keep in mind that owning the most expensive tool does not mean you will automatically do the best work. Prices listed below represent what you can reasonably expect to pay for a quality tool.

In addition to tools and books, you will be required to purchase a \$175 American Boat and Yacht Council (ABYC) Student Membership as part of the course. The ABYC is the leading standards organization for recreational boats and smaller commercial vessels, as you will learn in class. Membership gives you access to the industry standards referenced in the class, as well as a discount on certification testing should you decide to pursue it. You will need your student ID number (issued the first week of class) to make this purchase.

As you accumulate tools, you will need something to put them in. When choosing tool storage keep in mind the workplace of a marine technician. During the course of a day, you will be in and out of a vehicle and on and off of a boat numerous times. Choose tool storage to facilitate mobility and protect your tools against loss off the dock. Additionally, consider that yacht owners do not appreciate damage to their interior from toolboxes. We have found that soft-sided bags are best for this line of work.

If you have any questions, please feel free to ask me. When you get in class, we will spend time discussing tool selection, but students have found that ordering tools after class starts often means not having the tools when you need them. Keep in mind that you are expected to have all required tools prior to the start of the second week of class.

I look forward to having you in class!

Kevin T. Ritz

Marine Systems Lead Instructor, NWSWB

Electrical Tools

The multimeter you purchase should meet the following requirements:

- AC/DC capable for voltage and current
- CAT III rated
- True RMS
- Low-z
- Diode test function
- Capacitance function

A clamp meter is not essential, but does make measuring amperage significantly easier and safer. The Klein CL800 provides this feature.

Crimpers should be the ratcheting type to facilitate repeatable crimps that are able to reliably pass the pull test. They should also have solid dies, not stacked plates. Double crimp dies must be spaced to crimp both the barrel and strain relief portions of double-crimp terminals. Crimps of insulated terminals must not pierce the insulation. Most importantly, crimpers must work with the terminals you are using. In the class we use Ancor double-crimp nylon terminals and FTZ single-crimp heat shrink terminals. While you will develop a preference for either double or single crimp terminals, it is worth having both crimpers for the inevitable occasion when you only have access to one type.

Wire strippers come in several forms. The ones you choose should produce repeatable results stripping right amount without breaking any strands. We prefer the gun type automatic strippers.

Tool	Brand	Model	Price	Priority
Digital Multimeter w/ Test Leads	Fluke	117	\$150	One Required*
Digital Multimeter w/ Test Leads	Klein	CL800	\$130	
Circuit Analyzer	Extech	CT70	\$150-200	Required
Single-Crimp Ratcheting Crimper	Ancor	701030	\$50-100	Required
Double-Crimp Ratcheting Crimper	Ancor	702010	\$50-100	Required
Automatic Wire Stripper	Ancor	702030	\$50-100	Required
NEMA L5-30 Male Plug	Marinco	305CRPN	\$20	Required
NEMA L5-30 Female Connector	Marinco	305CRCN	\$30	Required
Adapter: NEMA L5-30 Male Plug to NEMA 5-15 Female Connector	Marinco	S30-15	\$40	Required
Adapter: NEMA L5-30 Female Connector to NEMA 5-15 Male Plug	Marinco	S15-30	\$40	Required
Diagonal Cutters				Required
Alligator clip test leads				Recommended
Insulated Screwdriver Set (Phillips and Slotted)				Recommended
AC Leakage Clamp Meter				Optional

*Buy either the Fluke 117 or Klein CL800

Corrosion Survey Tools

Corrosion surveys primarily use an electrician's tool kit with a few specialized additions. The supplies below will be used to build some of these tools in class. The zinc reference electrode can be bought at the school for a discount.

Tool	Brand	Model	Price	Priority
Mil. Spec. Zinc Reference Electrode	Electro-Guard	RP-2	\$98	Required
Wood Handled Scratch Awl	Stanley	69-122	\$4-7	Required
Solder-on Banana Plugs Male and Female (5 each)			\$10	Required
Small Wire Brush			\$3-7	Recommended
Sawzall Blade			\$1	Recommended
12 AWG Black Silicone Wire, 25 ft			\$20	Optional

Layout Tools

Tool	Brand	Model	Price	Priority
Small framing square			\$10-20	Required
Tape measure			\$12	Required
Level			\$20	Required
Scratch awl (separate from corrosion)			\$4-7	Required

Personal Protective Equipment

Tool	Brand	Model	Price	Priority
Safety Glasses				Required
Hearing Protection				Required
Dust Masks				Required
Nitrile Gloves				Required

Other Tools

Tool	Brand	Model	Price	Priority
Box Cutter			\$5	Required
16oz Ball Peen Hammer			\$12	Required
Cordless Drill	Makita	XFD10R	\$190	Recommended
Square Drive Screwdriver Set			\$15-30	Recommended
Headlamp and/or flashlight			\$20	Recommended

Mechanical Tools

The **Gear Wrench Auto TEP Introduction Set** contains the required mechanical tools for the class and can be purchased for \$450-650. You can also build your own kit and may save money by doing so. The tools you should have are listed below. Note that a gasket scraper is not the same as a paint or cabinet scraper.

Tool	Brand	Model	Price	Priority
3/8" Drive Ratcheting Socket Wrench			\$20-60	Required
1/4" Drive Ratcheting Socket Wrench			\$20-60	Required
3/8" Drive 6-Point Sockets 6mm-22mm			\$20-100	Required
3/8" Drive 6-Point 32 mm Socket			\$5-10	Required
3/8" Drive 6-Point Sockets 1/4"-1"			\$20-100	Required
1/4" Drive 6-Point Sockets 4mm-15mm			\$20-50	Required
1/4" Drive 6-Point Sockets 3/16"-9/16"			\$20-50	Required
Metric Wrenches 8mm-22mm			\$20-200	Required
Standard Wrenches 1/2"-1"			\$20-200	Required
Screwdriver Set – Flat, Phillips, and Nutdriver			\$30-\$50	Required
15 Blade Feeler Gauge	GearWrench	162D	\$15-30	Required
Needle Nosed Pliers			\$15-30	Required
1/4" and 3/8" Socket Extensions, 3" and 6"			\$15	Required
8" Crescent Wrench			\$20-50	Required
12" Crescent Wrench			\$20-50	Required
3/8" Drive Breaker Bar			\$15-30	Required
Gasket Scraper			\$10-20	Required
Standard Hex Wrench Set			\$10	Required
Soft Face or Dead Blow Hammer			\$15-30	Recommended
Vise Grip			\$15-30	Recommended
Channel Lock Pliers			\$15-30	Recommended
Thread ID Kit	Parker	MIK-1	\$45	Optional