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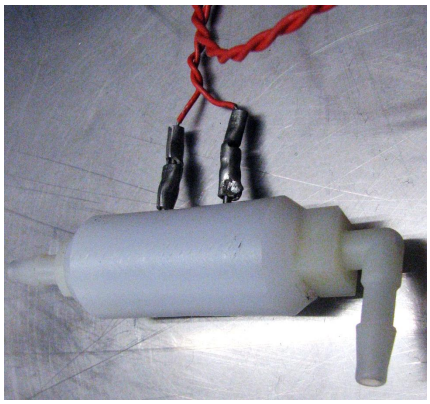
Fabrication of a Conductivity Sensor



EAS 199B – PSU Version

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Examples of Conductivity Sensors

http://www.sensorex.com

www.globalw.com

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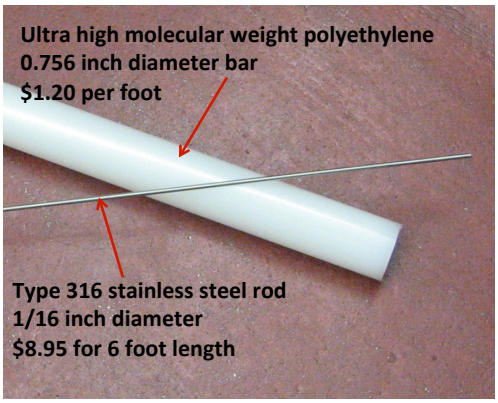
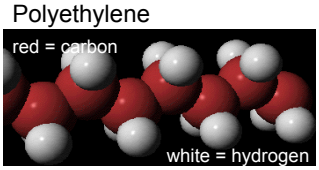
Raw Materials



Ultra High Molecular Weight Polyethylene



Chain molecules align more than for lower density polyethylene (packed together more tightly)

color:	**opaque white**	excellent electrical insulator
temp range:	**-22 to 180 F**	use indoors
softening temp:	**275 F**	machine with standard tooling
tensile strength:	**poor**	hardness: shore D60-D69
impact strength:	**good**	
low friction		

Polyethylene: This group of plastics encompasses a wide variety of grades with a wide range of properties. Low-density polyethylene is commonly used in shrink wrap applications. High-density is often used in pipe, shipping pallets and truck bed liners.

Includes:
- LDPE (low density polyethylene)
- HDPE (high density polyethylene)
- UHMW (ultra high molecular weight)
- VHMW (very high molecular weight)

SOURCE: Phone order from McMASTER-CARR®

Also known as . . .
poor-man's teflon

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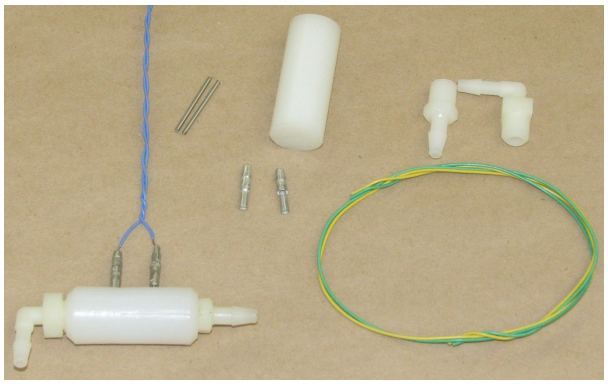
Parts and Materials



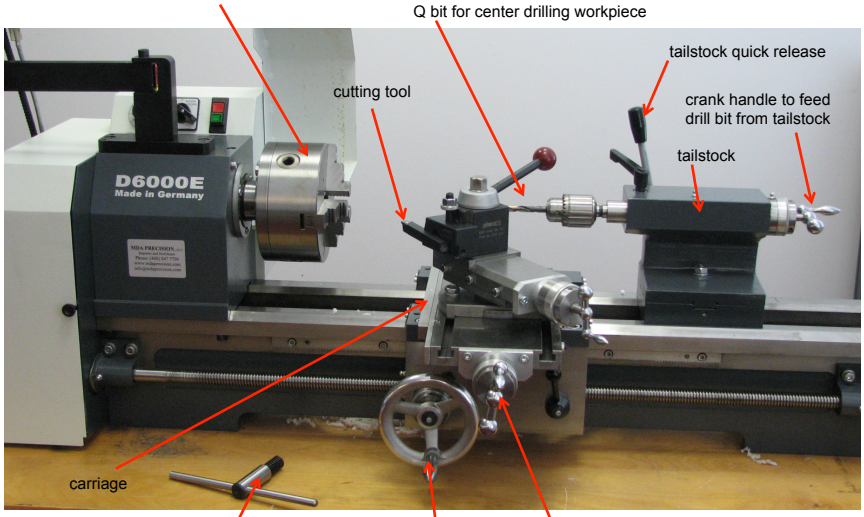
UHMWPE rod - 3/4" diameter (cut to 1 3/4 inch long) - may be larger diameter
s/s round type 316 1/16" dia rod 72" long (2 pieces cut to 1 inch long)
22 gage solid wire (40 inches total)
crimp-on snap-plug terminal, non-insulated male, 22-18 AWG, .156" plug dia (2 pi
2 nylon barbed fittings - 3/16" tube ID, 1/8 NPT male (straight + 90 degree)

Fabrication with Lathe

- Sensor body is a hollow cylinder
- Geometry is appropriate for lathe

Lathe

You must become familiar with the operation and safety procedures of the tools before beginning the project.



After cylinder is completed

- Tap ends for barbed fitting
- Drill holes and insert sensor probes
- Attach wire leads to the sensor probes

Create Threads in Each End using 1/8 NPT Tap

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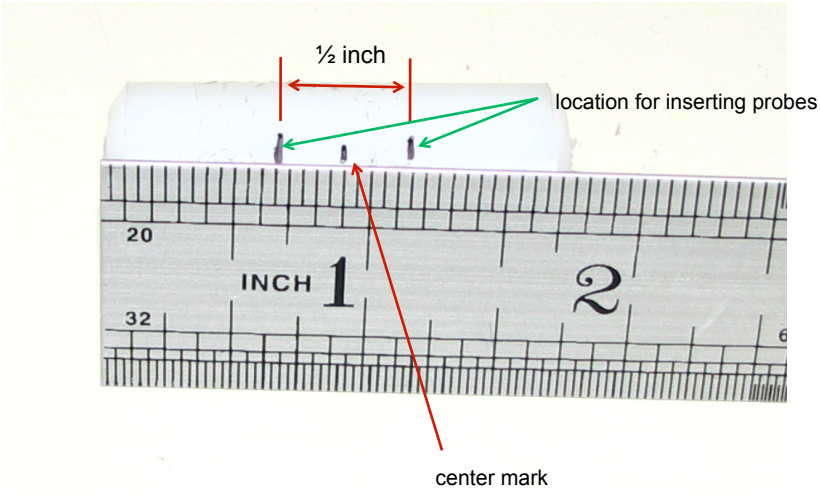
Mark Locations for Conductivity Probes



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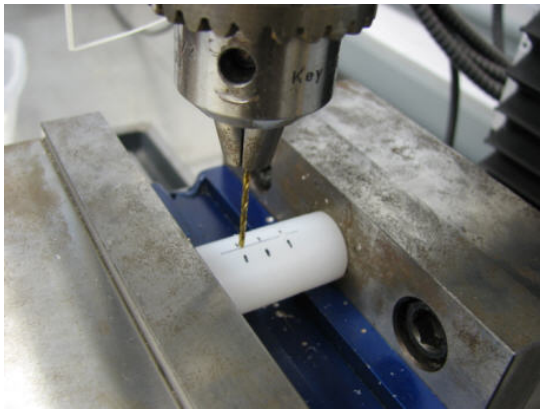
Drill Holes for the Probes

1) Rest the ends of the workpiece on the parallels (different parallels may be used)
2) Use a #53 drill bit (0.059 inch diameter) so the 0.0625 inch SS rod will be press fit into the hole
3) Drill 0.625 inches deep (this is 1/8 of an inch shy of going all the way through)



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Cut 1/16 inch Stainless Steel Rod *(already done for you)*

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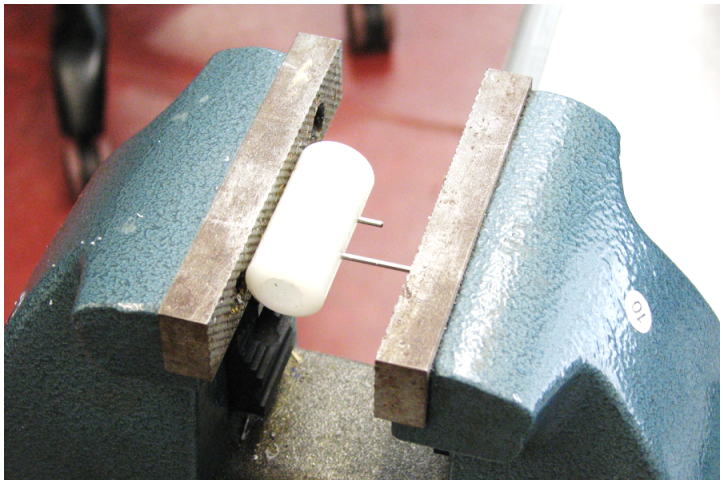
Press the Rods into the Holes

This is a little tricky. Go slow and keep the rod in place with one hand while slowly tightening with the other.



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Press Terminals onto SS Rods using Vise (or tap on with hammer)

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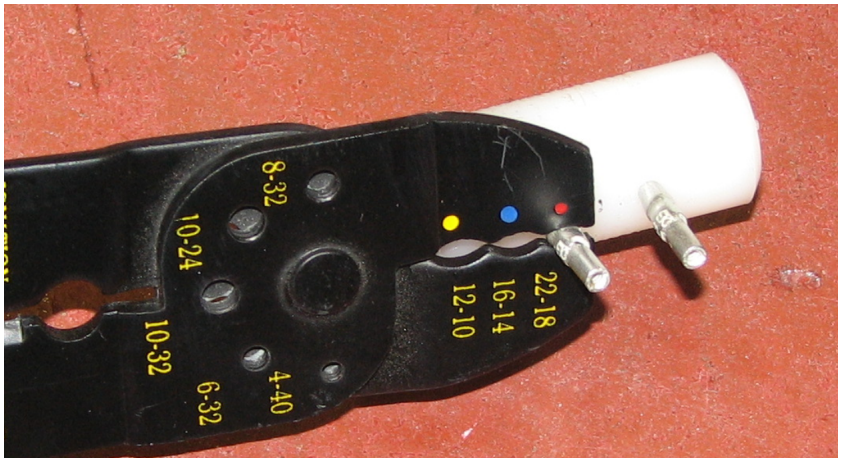
Crimp Terminals onto Stainless Rods



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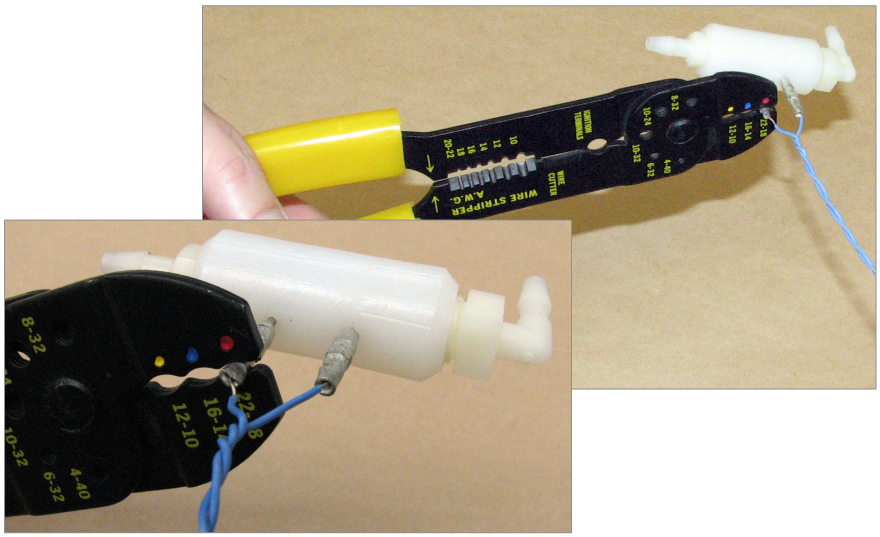
Crimp 20-inch Piece of 22-Gauge Wire onto Terminal

Be sure to strip the ends of the wire before crimping ☺



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CONGRATULATIONS – You're Done!!!!