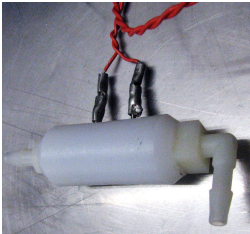
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Fabrication of a Conductivity Sensor



EAS 199B – PSU Version

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Examples of Conductivity Sensors



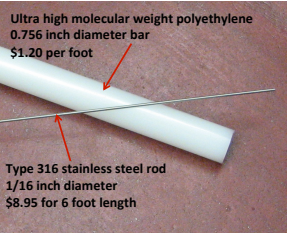
Process Conductivity



<http://www.sensorex.com> www.globalw.com

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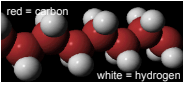
Raw Materials



Ultra high molecular weight polyethylene
0.756 inch diameter bar
\$1.20 per foot

Type 316 stainless steel rod
1/16 inch diameter
\$8.95 for 6 foot length

Ultra High Molecular Weight Polyethylene




red = carbon
white = hydrogen


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

Color:	opaque white	Excellent electrical insulator
Temp range:	-22 to 182 F	use molten
Melting temp:	272 F	machines with standard tooling
Stiffness:	poor	hardware shown D30-D35
Impact strength:	good	
UV Resistor:	good	

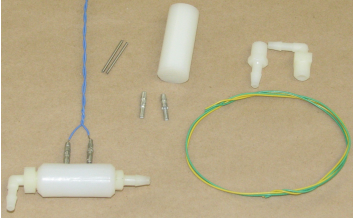
Polyethylenes: This group of plastics encompasses a wide variety of grades with a wide range of properties. Low-density polyethylene is commonly used in shrink-wrap applications. High-density is often used in pipe, shipping pallets and truck bed liners.
Includes: • LDPE (low density polyethylene) • LHMW (Ultra high molecular weight) • HDPE (high density polyethylene) • UHMW (very high molecular weight)

SOURCE: Phone order from 

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
316 stainless steel rod - 1/16" dia rod 72" long (2 pieces cut to 1 inch long)
22 gauge solid wire (40 inches total)
crimp-on snap-plug terminal, non-insulated male, 22-18 AWG, .156" plug dia (2 pieces)
2 nylon barbed fittings - 3/16" tube ID, 1/8 NPT male (straight + 90 degree)

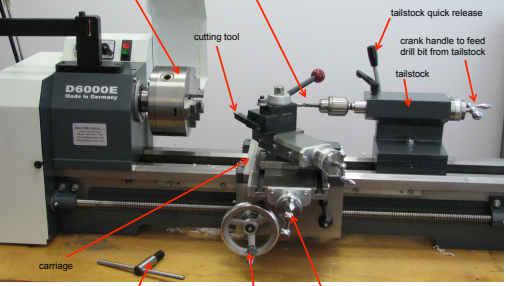
Fabrication with Lathe

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

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Lathe

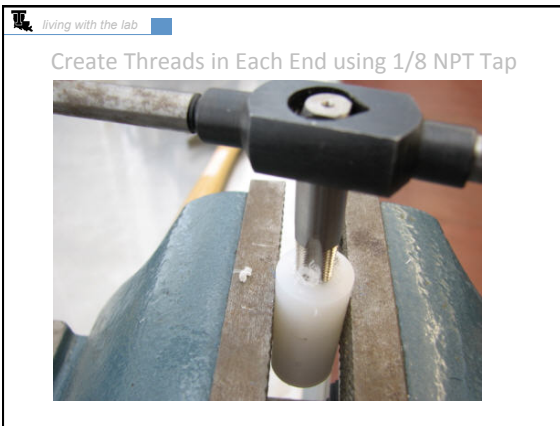
You must become familiar with the operation and safety procedures of the tools before beginning the project.

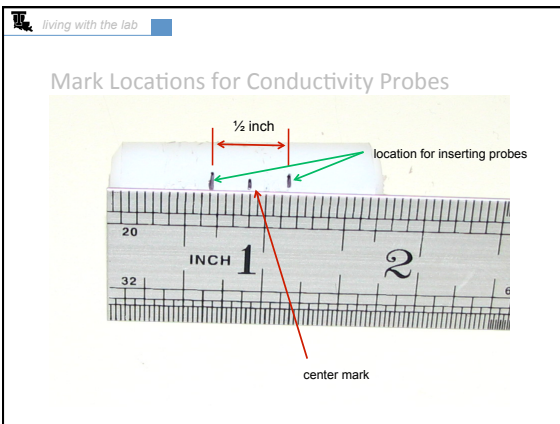



Labels in image:
spindle and chuck
cutting tool
Q bit for center drilling workpiece
tailstock quick release
crank handle to feed drill bit from tailstock
tailstock
carriage
key for chuck
crank handle to move the carriage
crank handle to move cross slide

After cylinder is completed

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

