

## Make Your Own MACHINABLE WAX

Anyone can get machineable wax; simply chuck up a candle! But it doesn't machine really well. This is because the wax needs to be kept really cold in order to machine it at all.

What is needed is a much firmer type of wax.

You can purchase it from many (US) suppliers: but, since it is so easy to make, who (in his or her right mind) would want to pay for the stuff? and import it? (I found no Australian suppliers). You can make your own!

What you need is:

**A suitable mold**.....- ideal is a box lined with paper or foil. The paper makes it easier to get the block of wax out of the mold. Don't use polythene containers as there is a risk they'll melt or dissolve!

**A candy thermometer**.....- or IR non-contact thermometer

**a pot**.....- big enough for the quantity you are going to make

**4 parts by weight of parafin wax**....- (candle wax) - coloured wax may be good or use coloured plastic. The colouring will make it easier to see what you're doing when machining.

**1 part by weight of polythene film**..- (cut into strips)

Melt the wax. You need it to get good and hot – about 275 degrees F (135C) or greater. It won't get there if you use a double boiler (water boils at 212F (100C) so that's the limit with a double boiler), so heat it directly on a low setting. Take care. Wax is flammable (like why else would it get used in candles?) and the flash point of 301C says "TAKE CARE!". Use a candy thermometer or infra-red non-contact thermometer. When it gets up there, drop in a couple of strips of polythene film and stir to dissolve them. They will dissolve quite slowly. Keep adding polythene and keep stirring until no more polythene will dissolve. You can allow the temperature to increase to an ABSOLUTE MAXIMUM of 200C as you dissolve more and more polythene.

The more polythene gets dissolved, the thicker the product becomes – it will take on a consistency like thick, smooth custard. When no more plastic will dissolve, scoop out any undissolved plastic, pour the wax into your molds, and allow to set.

In my trials of this stuff, I found that when it is set and cool. it has a density of around 0.9 grams per cubic centimetre – just a little lighter than water – sorta like an iceberg. This means it's easy to estimate how much to make to fill your molds. Actually, you should make maybe 5% more to allow for shrinkage as it cools.

The wax machines cleanly in the mill, with a good finish. Very little wax becomes stuck on the cutter and there is no evidence that the wax melts as it is cut. I used a 10mm end mill at about 200 rpm, and no coolant. Higher speeds should be OK.

The following data have been gleaned from a number of (US) suppliers web sites. The info supplied on those websites is so consistent you might even think that they have all copied from each other!

Hardness: 50-55 (Shore "D" scale)  
Specific gravity: .92  
Flash Point of: 575°F/ 301.7°C  
Softening point: 226°F/ 107.8°C  
Volumetric shrinkage at room temperature: 7%

Contains No Class 1 Ozone Depleting Chemicals!

Does not produce hard edge chips.

Non-toxic.

Self-lubricating, non-abrasive and will not fuse when machined at high-end spindle rpm's and feed rates.

May be remelted, recast and machined again without any loss of original properties.

Will not gum up on tool bits.

Drill & Ream It

Saw Or Carve It

Mill It

Thread It

Assemble It & Check Dimension

Turn It

Chamfer It

The following prices came from one supplier, but seem to be typical:

3"W x 7"L x 1.5"H Rectangular Block	\$13.50
3"W x 7"L x 3"H Rectangular Block	\$22.55
5"W x 10"L x 3"H Rectangular Block	\$52.90
6"W x 12"L x 3"H Rectangular Block	\$66.26
24"W x 24"L x 2"H Rectangular Block	\$337.80
2" Dia. x 12" Cylinder	\$11.25
3" Dia. x 12" Cylinder	\$30.45
4" Dia. x 14" Cylinder	\$48.10
6" Dia. x 18" Cylinder	\$145.80
1.5" Dia. x 12" Cylinder	\$10.15