

## Polymer Resources

Web Sites (revised 4 Sep 06)

Macrogaleria -- <http://pslc.ws/mactest/maindir.htm>

The Story of Rubber -- <http://www.pslc.ws/macrog/exp/rubber/menu.htm>

National Plastics Center and Museum -- <http://www.plasticsmuseum.com/>

Polyed -- <http://www.uwsp.edu/chemistry/polyed/> (go to About Polymers for lessons)

Brian Niece -- <http://www.assumption.edu/users/bniece/Olympiad/Olympiad.html>

<http://www.chemheritage.org/> (This site offers many tools for the researcher, the student and those who want to explore and discover how chemical and molecular science has changed the world we live in)

[www.handsonplastics.com](http://www.handsonplastics.com) (This site offers lesson plans and activities on line. They also have a free kit that you can order that has some plastic samples in it. Sometimes the kits are backordered and not readily available)

[www.packagingtoday.com/intronaturalpolymers.htm](http://www.packagingtoday.com/intronaturalpolymers.htm)

[www.pembinatrails.ca/vincentmassey/topchem/chemtop.html](http://www.pembinatrails.ca/vincentmassey/topchem/chemtop.html)







[www.beyonddiscovery.org/](http://www.beyonddiscovery.org/) (In the upper left corner is a timeline. Uncheck all categories except Polymers and People to view the polymer timeline. Also below in the article index, check out Chemistry)

[www.plastiquarian.com/ind3.htm](http://www.plastiquarian.com/ind3.htm) (this site has a good timeline and info on people)

[www.nationalgeographic.com/resources/ngo/education/plastics/](http://www.nationalgeographic.com/resources/ngo/education/plastics/)










[www.tangram.co.uk/](http://www.tangram.co.uk/) (On the left click on "Technical Information". About 1/4 of way down the page you will find a whole section on Plastics. There is an excellent timeline)

[http://online.sfsu.edu/~jge/html/body\\_chapter2.html](http://online.sfsu.edu/~jge/html/body_chapter2.html)

	Polyethylene Terephthalate (PET)	High Density Polyethylene (HDPE)	Polyvinyl Chloride (PVC)	Low Density Polyethylene (LDPE)	Polypropylene (PP)	Polystyrene (PS)
Plastic ID Code	 PETE	 HDPE	 V	 LDPE	 PP	 PS
Clarity	Clear	Translucent	Clear	Translucent	Translucent	Clear
Moisture Barrier	Fair to Good	Good to Excellent	Fair	Good	Good to Excellent	Poor to Fair
Oxygen Barrier	Good	Poor	Good	Poor	Poor	Fair
Max. Temperature	120F	145F	140F	120F	165F	150F
Rigidity (Stiffness)	Moderate to High	Moderate	Moderate to High	Low	Moderate to High	Moderate to High
Resistance to Impact	Good to Excellent	Good to Excellent	Fair to Good	Excellent	Poor to Good	Poor to Good
Resistance to Heat	Poor to fair	Good	Poor to Fair	Fair	Good	Fair
Resistance to Cold	Good	Excellent	Fair	Excellent	Poor to Fair	Poor
Resistance to Sunlight	Good	Fair	Poor to Good	Fair	Fair	Poor to Fair



Plastic ID Code "7" is for the other plastics except above mentioned 6 groups.

Polymer	Symbol	Recycling Code	Type Polymerization	Monomer	Density
polyethylene terephthalate	PETE		condensation	$\left[ \begin{array}{c} \text{O} \quad \text{O} \\ \parallel \quad \parallel \\ \text{C} - \text{C}_6\text{H}_4 - \text{C} - \text{OCH}_2\text{CH}_2\text{O} \end{array} \right]_n$	1.27
high density polyethylene	HDPE		addition	$\left[ \text{CH}_2\text{CH}_2 \right]_n$	0.95
polyvinyl chloride (PVC)	V		addition	$\left[ \begin{array}{c} \text{CHCH}_2 \\   \\ \text{Cl} \end{array} \right]_n$	1.38
low density polyethylene	LDPE		addition	$\left[ \text{CH}_2\text{CH}_2 \right]_n \left[ \begin{array}{c} \text{CH}_2\text{CH}_2 - \\   \\ \text{CHCH}_2 \end{array} \right]_m$	0.92
polypropylene	PP		addition	$\left[ \begin{array}{c} \text{CHCH}_2 \\   \\ \text{CH}_3 \end{array} \right]_n$	0.90
polystyrene	PS		addition	$\left[ \begin{array}{c} \text{CHCH}_2 \\   \\ \text{C}_6\text{H}_5 \end{array} \right]_n$	1.05
polycarbonate	PC		condensation	$\left[ \text{O} - \text{C}(=\text{O}) - \text{O} - \text{C}_6\text{H}_4 - \text{C}(\text{CH}_3)_2 - \text{C}_6\text{H}_4 \right]_n$	1.20
polymethyl-methacrylate	PMMA		addition	$\left[ \begin{array}{c} \text{CH}_3 \\   \\ \text{CCH}_2 \\   \\ \text{C}=\text{O} \\   \\ \text{O} \\   \\ \text{CH}_3 \end{array} \right]_n$	1.16
nylon-66	N-66		condensation	$\left[ \text{C}(=\text{O})\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{C}(=\text{O})\text{NHCH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{N}(\text{H}) \right]_n$	1.14

