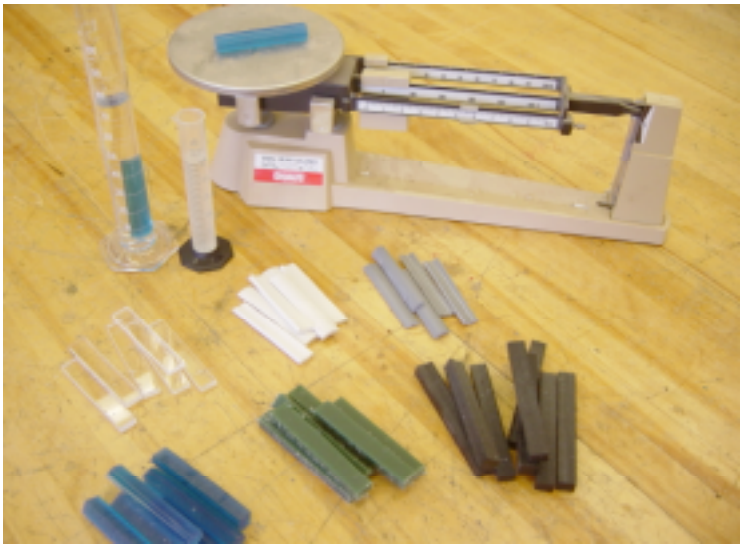
Specific Gravity Group Module: 8	TEL 204: Polymer Molding & Forming Department of Technology	Student Name:

Overview:



Plastics repair and recycling requires correctly identifying different plastics. One laboratory test that assists with the identification of any material is to determine the specific gravity of the material. You will be given a number of different material samples. You will determine the weight of the sample while it is in water. Then you will determine the specific gravity of each sample. Show all work as you perform each calculation. Specific gravity (SG) is related to a material's density. There are numerous ways to calculate specific gravity.

Results:

Sample	Sample 1 SG	Sample 2 SG	Sample 3 SG	Average SG
A				
B				
C				
D				
E				
F				
G				
H				
I				
J				

Grade:

Specific Gravity (70)	Calculation Notes (20)	Clean Up (10)	Total
Instructor Signature:		Date:	

Specific Gravity

Specific gravity is the density of a material relative to the density of pure water (at 1 standard atmospheric pressure and room temperature (73F)). Specific gravity has no units since it is simply a ratio. The specific gravity of water is 1 gram/cm^3. Specific gravity are used by plastic molders and product designers to determine how much a finished plastic part will weigh. A plastic which has a low cost per pound but a high specific gravity may not be as cost effective as a more expensive material with a low specific gravity. A mold for a plastic part has a set volume. Volume can naturally be calculated in cubic inches, cubic centimeters, cubic millimeters, etc. To determine the weight of a part the following general formula is used:

(Volume) x (Specific Gravity) x (Conversion Factor) = Weight

If volume is measured in **cubic inches** and you are looking for weight in **pounds**:
(cubic inches) x (Specific Gravity) x (0.0361) = (pounds)
If volume is measured in **cubic centimeters** and you are looking for weight in **pounds**:
(cubic centimeters) x (Specific Gravity) x (0.0022) = (pounds)
If volume is measured in **cubic millimeters** and you are looking for weight in **pounds**:
(cubic millimeters) x (Specific Gravity) x (0.0000022) = (pounds)
If volume is measured in **cubic Inches** and you are looking for weight in **grams**:
(cubic inches) x (Specific Gravity) x (16.387) = (grams)
If volume is measured in **cubic centimeters** and you are looking for weight in **grams**:
(cubic centimeters) x (Specific Gravity) x (1) = (grams)
If volume is measured in **cubic millimeters** and you are looking for weight in **grams**:
(cubic millimeters) x (Specific Gravity) x (0.001) = (grams)

These formula are based on the following conversions:
1 cm^3 = 0.061 in^3
1 in^3 = 16.387 cm^3
1 cm^3 = 1000 mm^3
1 lb = 453.592 gms
1 gm = 0.0022 lb
1 oz = 28.35 gms
1 gm = 0.0353 oz

Additionally, price per pound can be converted to price per cubic inch using the following:

cents/lb x .0361 x (specific gravity) = cents/in^3

Directions:

1. Fill a container with distilled water. Add a few drops of detergent to act as a wetting agent. This will reduce the number of air bubbles that stick to the samples.
2. Attach a string to the balance plate by knotting the string and taping it to the pan.
3. Wet the string and zero the triple beam balance.
4. Select three samples of the same material.
5. Clean and dry the samples.
6. Place a sample on the pan and measure the mass. Record the result.
7. Tie the same sample to the string and submerge the sample in water. Record the result. Brush off any bubbles on the sample or string with a fine brush.
8. Subtract the second result from the first to find the difference.
9. Calculate the specific gravity using the equation below.

$$\text{Specific Gravity} = \frac{\text{Mass of sample in air}}{\text{Mass of sample in air} - \text{Weight of sample in water}}$$

10. Repeat this procedure for each of the three samples.
11. Average the result of the three samples.
12. Place all data on results table on page one.
13. CLEAN benches. Wipe up ALL WATER. Put samples and tools away!

BUT WHAT IF THE SAMPLE FLOATS ? - Different Formula !

If the sample floats, then you will need to use a different technique to calculate specific gravity. You will need to weigh a volume of water that is equal to the volume of the sample.

1. Put 70ml of room-termperature distilled water into a 100ml graduated cylinder.
2. push the sample down into the cylinder until it is completely submerged.
3. Record how much water is DISPLACED.
4. Assume that 1ml of the distilled water weighs 1gm.
5. Calculate specific gravity using the following formula

$$\text{S.G. of FLOATING sample} = \frac{\text{Mass of solid (in grams)}}{\text{Mass of equal volume of water (in grams)}}$$

Data:

Sample	Mass in Air	Weight in Water	Specific Gravity	Average Specific Gravity
A1				
A2				
A3				
B1				
B2				
B3				
C1				
C2				
C3				
D1				
D2				
D3				
E1				
E2				
E3				
F1				
F2				
F3				
G1				
G2				
G3				
H1				
H2				
H3				
I1				
I2				
I3				
J1				
J2				
J3				