Densities of Cylinders

Objective/Point: To determine the materials in different cylinders by measuring their densities.

Silverish:

Mass (g)	dM (g)	Diameter (cm)	dD (cm)	Height (cm)	dH (cm)	Volume (cm^3	Density (g/cm^3)
17.5	0.1	1.25	0.01	5.06	0.01	6.21	2.82
17.9	0.1	1.21	0.01	5.04	0.01	5.80	3.09
17.5	0.1	1.22	0.01	4.95	0.01	5.79	3.02
18.1	0.1	1.23	0.01	4.96	0.01	5.89	3.07
17.5	0.1	1.23	0.005	5.01	0.005	5.95	2.94
						5.93	2.99

Dirty Silver:

Sample Calculations:

V = Pi * (D/2)^2 * H = 3.145*(1.25cm/2)^2*5.06cm = 6.21 cm^3
Density = M/V = (17.5 g/ 6.21 cm^3) = 2.82 g/cm^3

Discussion:

Based on our measurements, the best density for the silverish cylinder is 2.99 g/cm^3. By examining established densities for various materials, it seems likely the cylinder is aluminum which has an accepted density of 2.78 g/cm^3 giving us a percent difference of 7.3%. There are other materials which better match our density but are unlikely to be in our possession. The color (silver) is consistent with it being aluminum. All the experimental results of the different groups are roughly consistent with each other. This suggests that any error is with the devices themselves. Therefore one might suspect that the balances were not zeroed properly, but this was checked and offsets were consistent with the uncertainties. It's hard to see how the calipers could be inaccurate. It's possible that the cylinders have been beat up sufficiently that the volume equation doesn't quite hold, but then one would expect quite different volumes from the different groups. Finally, we are forced to conclude that the material is probably some type of aluminum.