

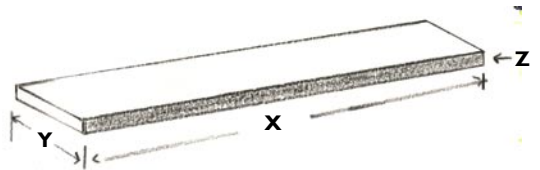
# Working with Shrinkage in PMC

**Binder** Each version of PMC has a different amount of binder and water. These ingredients evaporate and burn away in the firing process, and this accounts for most of the shrinkage we see. The volume of binder and water in Original PMC is 28%, so it only makes sense that the shrinkage rate of fully fired Original PMC is 28%. The binder and water in the other versions account for 12% of the total volume.

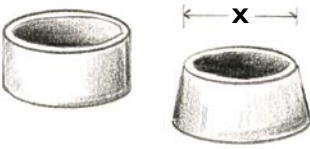

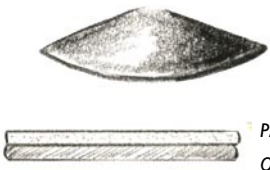
**Density** The longer you fire something, the more the microscopic particles of silver can merge together, which has the effect of increasing shrinkage slightly. This is a much smaller factor than removing the binder, typically a percent or two.

**Tests** We can measure shrinkage by weight, volume, or size. Weight is easy: we can weigh a sample of PMC before and after firing, and we'll know the proportion of binder and water to silver. In the case of PMC, all packages are marked with the weight of silver. Volume can be confusing—if I told you that sample A has 18% greater volume than sample B, I doubt you'd know much more than you did before. Measurements in millimeters or inches are a more familiar way to think about size... but even this can be confusing.

**Proportion** Because the changes in PMC happen at a microscopic level, shrinkage in PMC is uniform in length, height, and thickness. As the example shows, this can be deceiving. Imagine a strip of Original PMC that is 3" long, ½" wide, and three millimeters thick. After properly fired, it will have shrunk by 28%, but your eyes will tell you otherwise. The length has gone down to 2", which is clearly noticeable. The width has gone from a half to three-eighths, which you can see with your eyes, but only after careful observation. The thickness probably seems about the same—it is now a little more than two millimeters. Your commonsense will tell you that it has shrunk a lot in length, a little in width, and hardly at all in thickness. If you look at the numbers, you'll see that each dimension has shrunk a little less than a third, as in 28%.



**Tricks** All the shrinkage numbers you read about, including the ones above, refer to firing in the absence of other factors. Shrinkage in PMC will take the path of least resistance. Here are some ways you can make this work for you:

 <p>If you place a ring with straight sides on a pad, friction around the base will drag on the lower edge while the upper edge contracts (X). To prevent distortion, sprinkle a little vermiculite or alumina to allow slipping.</p>	 <p>It is possible to “steer” shrinkage by cutting slits in a PMC object. Not only does this minimize unwanted distortion, but it can add a decorative element.</p>	 <p>If you laminate two versions of PMC that have different shrinkage rates, the form you make will be pulled up into relief as one side contracts more than the other. It works best if the two parts are about the same thickness.</p>
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