Drafting Rules

someonesdad1@gmail.com 3 Feb 2010 (updated 11 Nov 2013)

For those of us who still use pencil and paper for doing dimensional layouts, here are some scales that I made for my own use. It occurred to me that I could programmatically generate them, print them on a laser printer, then glue them to a piece of wood. I could finally have the scales I've always wanted. These primarily are 6 inch long rules that contain both decimal inch and millimeter scales in the following drawing scales: 1X (i.e., full-size), 2X (double-size), 3X, 4X, 5X, 1/2 (half-scale), 1/3, 1/4, and 1/5.

Each of these scales includes a scale for the opposite side of the rule that contains inch and mm scales half the scale of the front side. This makes it handy to find a midpoint or set a compass.

There are also two pages containing the inch and mm scales at 10 inches long.

If you print out on paper, be aware that the scale may change in size due to humidity changes. You may want to print on transparency stock or a plastic paper to avoid this problem. For the six inch rules, I plan to glue them to some wood and spray over everything with a clear acrylic spray, both to protect against humidity changes and to reduce the wear on the scales from the fingers (your fingers will eventually wear the printer's toner off the paper).

If you print them, make sure your PDF client is set to print them at actual size, not fit them to the paper -- otherwise, they won't be accurate. When I printed my scales on paper, I measured the 6 inch separation with an 18" Vemco drafting rule, which I know matches my Starrett machinist rules (i.e., this Vemco rule is very accurate). I measured using a 4X loupe to view the graduations. The separation of the 6 inch mark was almost perfect. Interestingly, as the paper cooled, it made a small but definite increase in the measurement (we usually assume most materials have a positive temperature coefficient of expansion). After a few minutes, the printed rule is slightly under 0.005" too long over the 6 inch length (i.e., 0.083% too long). This is fine for normal drafting work.

Update 11 Nov 2013

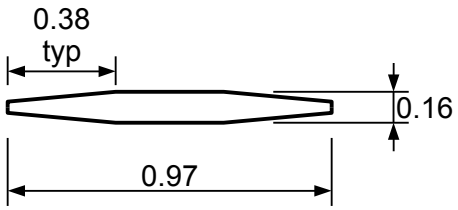
In case you're wondering why I made these rules, it's because it's just too easy sometimes to grab the drafting rule and use the wrong scale. The typical store-bought rule crams as many scales on it as possible (four for flat ones, six for triangular ones). Then, when you're in the heat of designing something at e.g. 1/4 scale, you're using the 40 divisions per inch scale, but the rule gets accidentally turned over and you unknowingly use the 50 scale. Yes, it occasionally happens and there's a mistake unless you catch it.

The update added a black stripe on the primary side of the 6 inch rules. This gives your subconscious a way to identify quickly that you're using the scale you should be. You'll make a drawing at one scale, so you really only need to have one rule out on the table at any time. Then, unless you're finding a midpoint or setting a compass, you're going to be using the scale with the black stripe.

An old drafting technique if you're using a triangular scale is to put a binder clip on it to ensure that it can't be turned to a different scale. This reduces the number of scales you can use to two, which may reduce the chance of an error. Alas, the old wooden triangular rule I use has the 40 and 50 scales opposite each other when I do this, so it's probably more likely that I'll make such an error. I don't like triangular scales, so I rarely use this one; if I do, then I'll do something like putting some tape over the scale I'm not using to avoid this error. In the last use of this rule, I wanted the 30 scale for a 1/3 layout; the 10 scale was opposite the 30 scale, so there was every chance I would recognize the wrong scale if I turned the rule. But it's not so easy to distinguish the 40 and 50 scales, as one inch on them is 1/4" and 1/5", which differ only by 0.05".

I have a small 6" plastic drafting rule that I got in the 1960's and it has seen a lot of use (I've used it

so much, the printing has been worn off so I can't see who made it). This little rule fits in a shirt pocket and is the rule I use when I'm drawing (I have a number of 12" and 18" rules, but the 6" rule is the most convenient). Here's a sketch of its dimensions in inches should you wish to make something similar:



The edges are thinner than that shown -- they are a rounded edge a diameter of about 0.5 mm (0.02 inches).

The scales start 0.3 inches in from the ends. Compared to my Mutoh clear plastic drafting scale, this little scale is 0.005" short in 6 inches.

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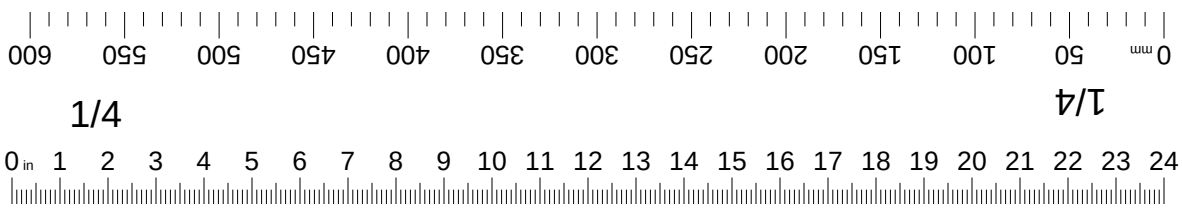

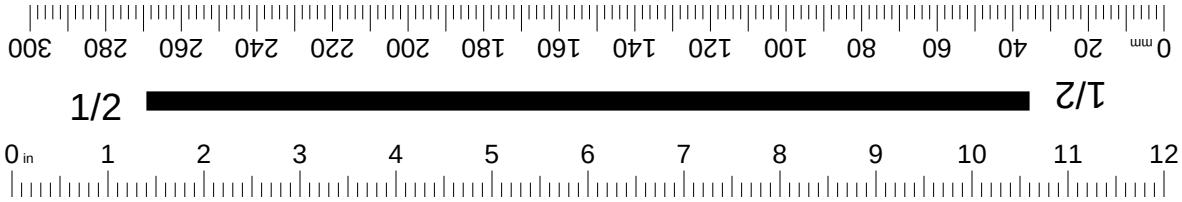

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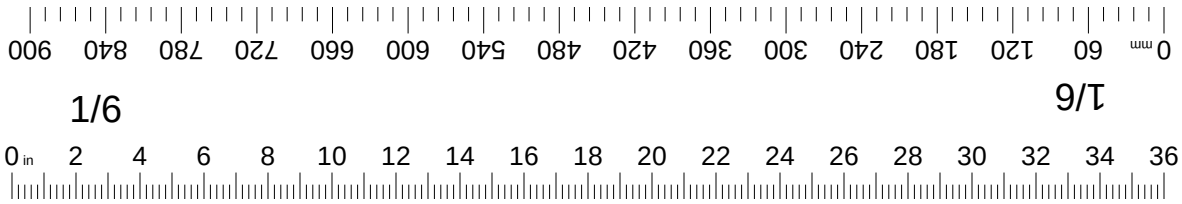

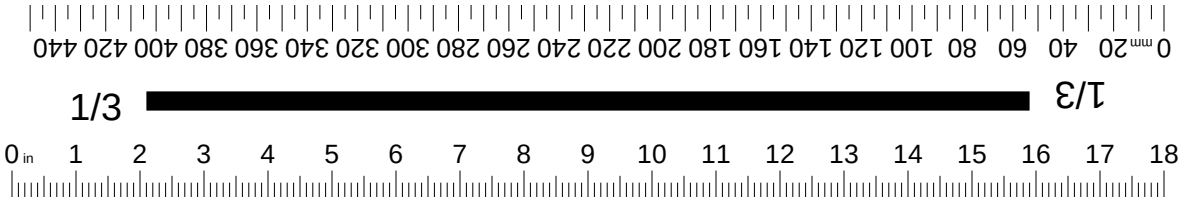

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0 in 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80
0 in 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60
0 in 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
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0 in 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
0 in 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1
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0 in 1 2 3 4 5
0 in 1 2 3 4 5 6 7 8 9 10


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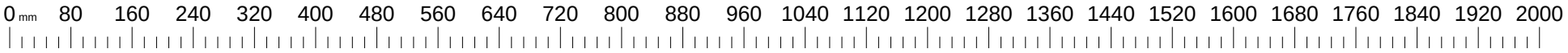
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