

SCALING MODEL AIRPLANE PLANS UP OR DOWN

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People usually think of a model airplane's size in one of two ways, either by its wing span, or by its wing area. This article is written specifically for those modelers who prefer to think of model airplane size in terms of wing area.

Let's consider a specific example. Joe Blow has a model plan left over from a kit he built. Joe really liked this plane, and now he wants to enlarge the plan so he can build a larger version of it, specifically one that has 1,275 square inches of wing area. The original kit model has a wing area of 589 square inches.

The problem now becomes: What enlargement setting should Joe set the large item copier at his local print shop in order to get a plan with 1,275 square inches of wing area? Several years ago, I was faced with a similar problem. After experimenting with a simple calculator for about an hour, I was able to come up with an algebraic equation (relax, it's not a big deal - Ed) that would yield the answer. What I discovered was this: The enlargement setting for the copy machine should be equal to the square root of the product of the desired wing area multiplied by 100, divided by the product of the original wing area multiplied by .01. Expressed as an algebraic equation this would be:

$$\text{ENLARGEMENT SETTING} = \sqrt{[(\text{Desired Wing Area})(100) / (\text{Original Wing Area})(.01)]}$$

Solving the equation for the above example, Joe would get:

$$\begin{aligned}\text{ENLARGEMENT SETTING} &= \sqrt{[(1275)(100) / (589)(.01)]} \\ &= \sqrt{(127500 / 5.89)} \\ &= \sqrt{(21646.859)} \\ &= 147.12871 \text{ or } 147\% \text{ rounded to 3 significant figures}\end{aligned}$$

In summary, if Joe enlarges the kit plan by 147% he will end up with an airplane that has the desired 1,275 square inches of wing area. The same algebraic equation works equally well for scaling down plans to a specific wing area. In this case, the number you plug in for the desired wing area will be smaller than the original wing area, and this will lead to an enlargement setting of less than 100%.