

Why is oven baking time such a hot issue?

Time is money

...is the short answer.

And it's why the desire to shorten deliveries to customers, even on straight time work, is so strong. Since bake cycle duration can easily be one of the biggest chunks of time in scheduling a project, it seems to be the perfect candidate for cutting.

But there are technical reasons to keep temperatures relatively low and cycle times in place.

Baking is used both to cure materials, and to create an environment which replicates that found in operation. Controlling both the temperature and duration of the bake cycle is important to avoid overheating. During bake-off, for example, overheating can result in a reduction in motor efficiency.

Why not shorten oven baking time?

In looking at the time required for rewinding small motors, the bake cycle seems to be the biggest item. Instead of four, six, or eight hours at 250°F to 300°F with Class F insulation, why not go higher in temperature for a shorter time?

What you can get away with depends upon the specific varnish or resin being used. But boosting oven temperature to apply the same total heat in less time can cause trouble. One result can be a quick surface cure that doesn't adequately penetrate to the material underneath.

Another possible problem is softening of the wire enamel in some places. If the impregnant contains solvents, rapid boiling off of that content at high temperature can leave pits or holes.

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Although today's insulation products can withstand higher temperatures, the resin compound requirements for curing must still be met. Further, the modulus of any given material will only allow it to accept a specific amount of thermal soaking. Raising the temperature unfortunately cannot speed this process.

Fortunately, with the manufacturing softwares, process improvements and expedited shipping options available today, deliveries can still be improved, putting more of your time (and money) to the bottom line.

"Bake cycle duration is calculated to obtain the greatest differential expansion of the copper segment pack to the steel assembly. This results in the highest molding pressure on the mica, forcing it to its most stable operating situation. Shortening thermal cycles adversely affects commutator stability under rotational stress."

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