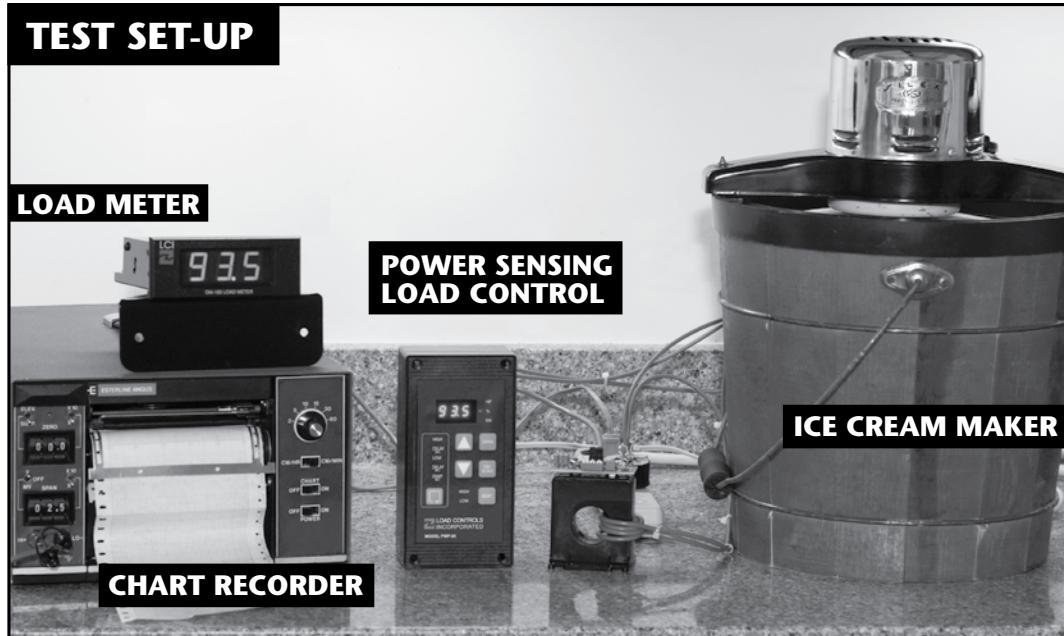


SENSING VISCOSITY CHANGE BY MEASURING POWER

Can the motor power on an agitator, mixer, extruder or pump give an indication of viscosity? Many food, chemical, paper, petroleum and pharmaceutical companies are now using power sensors for this exact purpose. The Load Controls, Inc. Research and Development group was able to use this approach to greatly improve a batch food process.

INCONSISTENT RESULTS

The traditional technique to determine if ice cream is done is to listen to the motor and when it slows, stop the process. Since this is totally subjective, the results are sometimes not perfect. Typically, the mixture is processed too long and crystallizes. These problems were not related to the recipe which has been passed through generations of Jon's family (who were obviously not on a high cholesterol diet).



TEST SET-UP

The set-up included the ice cream mixer connected to a power-sensing load control. The control has an analog output which was hooked to both a load meter and a chart recorder.

POWER BETTER THAN CURRENT

The control measures power (watts or horsepower). The increase in power during the process was 15% compared with an increase in current (amps) of only 5%. Measuring power in this case gave us a 3X improvement in sensitivity. This proved to be critical.

SURPRISING RESULTS

During the first 15 minutes, the power level didn't change. The next 15 minutes showed a very slow increase and during the last 10 minutes, the power increased sharply. Suddenly, just short of 40 minutes, the power dropped!

The entire staff, suspecting that something was afoot, agreed that we should stop. The ice cream was smooth and perfect. Perhaps it had just started to crystallize. We plan to verify these results as soon as our diet will allow.

THE LAST 15 MINUTES OF THE EXPERIMENT

