# AUTOHFR HFR2 Control Software

The standard HFR-PC control software allows the user to define the frequency, stroke length, temperature and duration of a single test. These parameters are held constant for the duration of that test. This is often desirable when wear testing in order to minimise variability in wear scar dimensions. Test conditions with constant control parameters are frequently specified in standard test methods such as those proposed for the evaluation of diesel fuel lubricity, CEC F-06-A-96.

However when evaluating the friction performance of lubricating oils the value of friction coefficient as a function of temperature may be of great interest. Boundary lubricant additives are frequently only active over a restricted temperature range and the ability to characterise this performance in one simple test is desirable.
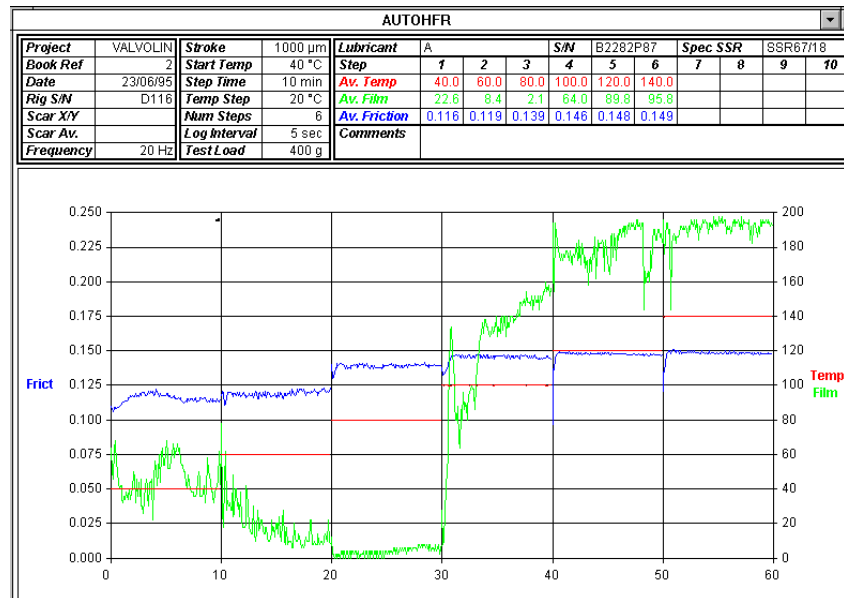
By using the AUTOHFR control software, the user has complete flexibility when defining the test profile. The profile is stored as a tab-delimited text file. Each profile can be built up from the **5 basic step types**, comprising temperature ramps and dwells, with the vibrator running or stopped. The MTU is usually fitted with higher power heaters so that tests may be performed at temperatures up to 200°C.

Not only can the temperature be changed during the test - but stroke length, load and frequency can also be altered for each step.

Data output is both graphical (which can be printed out using AUTOHFR) and formatted text (which can be manipulated in a spreadsheet).

The AUTOHFR software enables the HFR2 system to step through a series of stroke lengths, frequencies and temperature values following any one of a number of standard programs or a custom program predefined by the operator. This is useful for evaluating boundary friction coefficients of lubricants as a function of temperature.

The programs are simple text files and can be easily constructed or edited.



**The 5 basic *steptypes*:**

**1 HOLD_TEMP**
This step will bring the specimen bath to the required temperature, wait until the temperature is stable, then hold that temperature for a user defined period.

**2 RAMP_TEMP**
This step will bring the specimen bath to the required start temperature, wait until the temperature is stable, then increase (or decrease) the temperature linearly to the end temperature in a user defined period.

**3 HOLD_TEMP_INDEFINITE**
This step will bring the specimen bath to the required temperature, wait until the temperature is stable, then display a user specified message. The system will hold the required temperature until the user clicks "OK" on the message dialogue. This step is commonly used to change the load.

**4 RUN_CONSTANT_TEMP**
This step runs the vibrator at the specified frequency and stroke length whilst controlling the temperature to the desired value.

**5 RUN_RAMP_TEMP**
This step runs the vibrator at the specified frequency and stroke length whilst linearly varying the temperature from the start value to the end value during the course of the specified step duration.

Datalogging can be turned on or off for any step.

Installation of the software is straightforward and AUTOHFR can reside on the same PC as HFR-PC - but cannot be running at the same time.

There are no mechanical changes needed to the MTU. Higher power heaters can be easily installed by the user if temperatures up to 200°C are required.