

# Efficiency Extra Edition

Spring is Here

T2E3 Newsletter

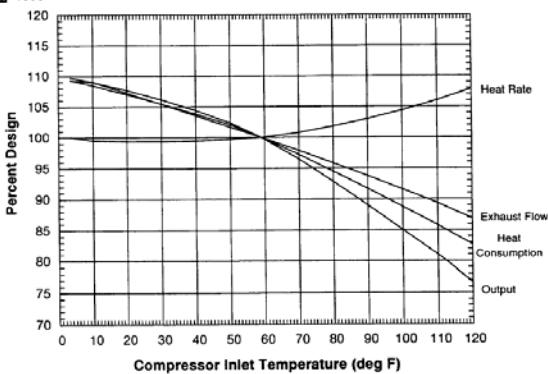
May 2009

## Monitoring Corrected Performance

Previous newsletters have dealt with planning and maintaining your performance monitoring system, but one thing which has not yet been discussed in detail is **Corrected Performance**.

Once you have your raw data selected, your sensors all calibrated and the data being read, analyzed and archived without a hitch, you're ready to look at trends. But, the first thing you may notice, is that **trends for maximum capacity and heat rate will vary depending on the current ambient conditions** (especially for gas turbine based plants).

Operators are quick to identify the deficiencies of their plants – noting that on hot days, the gas turbine is output limited. But is this MW limit due to the ambient conditions alone, or is there something else going on? The only way to know, is to have a baseline set of expectations for the unit as ambient conditions change. These expectations are most often presented to the user as a set of performance correction curves, such as the following:



Gas turbine output and heat rate vary with the density of the air entering the compressor – or, more directly, with compressor inlet temperature, humidity and pressure. The OEM normally provides performance curves for how the gas turbine

responds to changes in these conditions. The curves can then be programmed into your performance monitoring system, and used to determine the corrected performance of your unit: the current operating data for your gas turbine (and/or plant) corrected to reference ambient conditions.

You can then **compare your corrected performance values (normally output and heat rate) to your design (or baseline) values**, and you can also trend them to see how the unit is degrading over time.

Because corrected performance values no longer include the expected changes in performance due to ambient conditions, any variances observed are due to other (potentially controllable) influences. Some of the differences could be normal wear & tear (degradation), but changes could also mean something significant has occurred in the operation - either software/controls or hardware.

When trends show large step changes in corrected performance, an investigation should be initiated ASAP to determine the cause of the change. **Step changes in corrected performance normally indicate something needs attention** – whether that's just an instrument failure, a plug in a fuel filter, or foreign object damage (FOD) needs to be determined.

The cause of the change needs to be identified to verify that continuing to run in the current state will not cause additional damage.

**By monitoring your corrected performance, you are on your way to finding the clues to a more reliable and more efficient plant.**

### Announcements

- **Read & Comment at Tina's Blog:** [www.t2e3.com/blog](http://www.t2e3.com/blog)
- **Next LM6000 Seminar Scheduled for September 2009 - see details on page 2**

### Products & Services

#### Analysis Tools

#### Excel Workbooks, Macros and Add-Ins:

- Corrected Performance
- Compressor Efficiency
- Steam & Water Flow
- Moist Air Properties

#### Training Seminars

#### Compressor Efficiency Tracking Software

#### Performance Monitoring Program Design, Support and Evaluation



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<http://www.t2e3.com/news.php>

## Seminar: LM6000 Performance Characteristics, Testing and Long-Term Condition Monitoring

The next LM6000 Performance Seminar is currently scheduled for September 2009, to be convenient for attendees to the Aero Users Group Annual Conference (<http://lm6000.users-groups.com/Events/2009/Info/>).

I am currently looking at holding the seminar on either Monday & Tuesday before the conference (**September 7 & 8**) or the Monday & Tuesday after the conference (**September 14 & 15**). If you would like to attend, and have a preference for the dates, please let me know by sending an email to [seminars@t2e3.com](mailto:seminars@t2e3.com).

Additional information on the seminar, including an agenda, can be found on at [www.t2e3.com/LM6000.php](http://www.t2e3.com/LM6000.php).

## T2E3 Add-ins for MS Excel

Streamline your analysis spreadsheets by using functions from the T2E3 Automation Add-ins. Available functions include ASME steam tables, ASHRAE air properties, orifice flow meter calculations and select performance functions, including: compressor efficiency and evaporative cooler effectiveness.

**For a complete function listing, available options or a trial version of an add-in contact T2E3 at 425-821-6036**

## T2E3 Performance Analysis Services for Power Plants

### Including:

**Analysis Tools & Software** – from customized spreadsheets to add-ins for Excel or complete compiled programs, T2E3 can develop software tools and analyses to support all your performance monitoring needs, including integrating your existing tools with available site data systems, to create online systems providing data and results in real-time.

**Training** – both public seminars and customized options are available. Highly interactive sessions increase attendees' knowledge and understanding of the thermodynamic cycles, instrumentation and analyses needed to improve equipment performance and reliability.

**Performance Test Support** – if your site is required to perform annual capacity or PPA performance tests, having Tina Toburen from T2E3 on site to direct the testing can lead to a smoother test execution with more consistent performance results. Professional reports can also be produced to communicate the results to all required parties.

**Site Marketing and Dispatch Support** – Do your marketers and/or dispatchers understand the operation of your facility? Do they constantly dispatch the plant at loads which are difficult or impossible to maintain? T2E3 can help you build tools and training programs to help all parties understand the expected changes in

performance due to ambient conditions and operating constraints. These tools can also lead to a greater understanding of the long-term economic outlook for your facility.

*Unlock the potential of your operation. Call for more information on how we can work together, today!*

