



"We may be able to save you about 5 to 10 percent of your production costs, with a payback of 6 to 12 months, with our PURIFIRE process management system."

Don Bowe,
Air Products
Senior Principal
Development Engineer



PURIFIRE[®] Process Management System

Let us help you improve your process efficiency with the PURIFIRE process management system

In the metals treating industry, your profitability depends on process improvements that can increase your efficiency and lower your overall costs. By using Air Products' PURIFIRE process management system to track and organize data about your operation, you can gain insight and information that could help you lower operating costs, increase production, improve quality and yields, and improve safety.

The system combines a Windows-based PC, customized software, and Air Products knowledge of heat treating operations to give you the ability to:

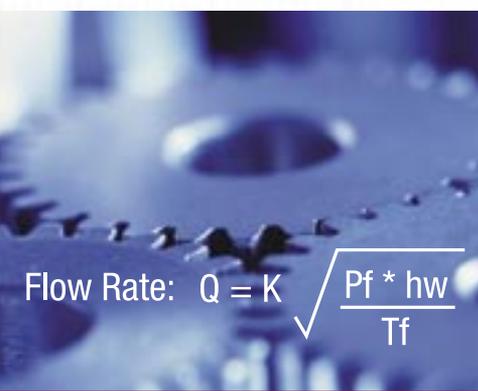
- log and display real-time process data for production monitoring
- archive and retrieve data for analysis and quick reference
- access data remotely using a standard Web browser or cell phone
- receive both local and remote process upset alerts
- automatically generate custom reports for internal review and for your customers
- consolidate all production information into one convenient area for easy access

Save time and money with accurate data

The process management system tracks and records multiple data streams from numerous points throughout your operation and then helps you convert that data into usable information.

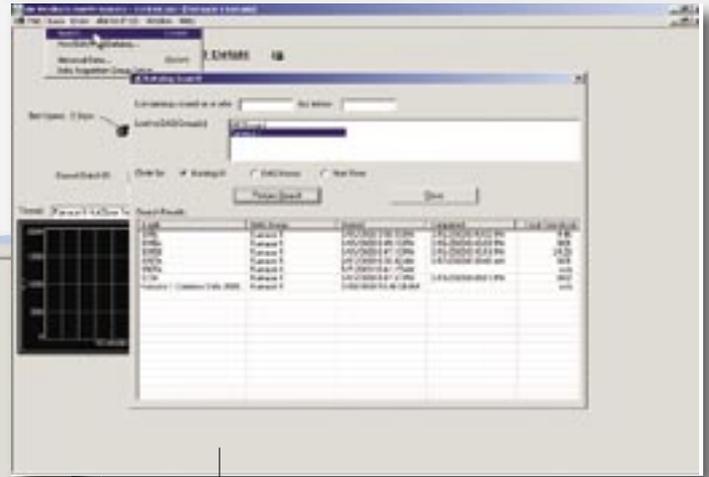
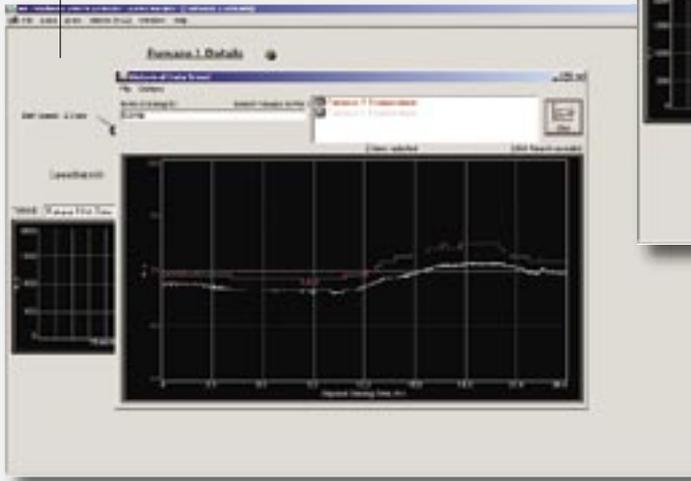
Having accurate, organized data can enhance your relationship with your customers and also help your bottom line. For example, the PURIFIRE process management system can help you:

- optimize your gas consumption and furnace performance by closely monitoring gas and utility usage rates and furnace variables such as time, temperature, and atmosphere flow rates and composition
- identify and minimize bottlenecks to help improve efficiency
- expedite troubleshooting
- decrease the variability in your process and potentially reduce scrap
- improve safety by monitoring a wide range of process areas and enabling automated alarms through your network
- reduce labor costs by eliminating manual data collection
- improve production management through enhanced product scheduling, recipes, and preventive maintenance
- track production by part, batch, shift, or other time stamp
- accelerate continuous improvement efforts with accurate, real-time information
- analyze data with SPC/SQC capabilities



Flow Rate: $Q = K \sqrt{\frac{P_f * h_w}{T_f}}$

By automating data collection, the PURIFIRE system collects data several times a second if necessary.



Historical operating data can be easily retrieved, giving you information that your end users are demanding.

A total solutions approach

The demands of each metal treating plant are unique. So are the optimal furnace atmospheres and operating parameters that impact product quality, cost control, the environment, and safety.

At Air Products, we make it our job to understand your business. Our industry specialists will meet with you to understand your unique needs and concerns. We'll also conduct a thorough PURIFIRE audit to look for opportunities for improvement by identifying the variables that affect production, process elements that should be measured and trended, and real-time data points that are useful in the preparation of production reports.

We can install all components of the PURIFIRE process management system—from the sensors to the network connections. And on an ongoing basis, Air Products technical specialists can provide software upgrades as new functionality is developed, as well as available data analysis, process control, and in-plant technical service.

Customized for the way you operate

Many off-the-shelf process control systems are limited in their ability to provide information across your operation. Often expensive to install and maintain, they can require significant operator training, limit information extraction, and complicate the integration of third-party hardware or software components.

In contrast, the PURIFIRE process management system can be designed to help you see what's going on inside your furnace as well as other areas of your operation. Air Products engineers will work with you to determine what variables are important to monitor and then custom-tailor a system that fits your specifications.

You can generate reports and graphs illustrating equipment performance, gas usage, process variables—virtually any information that may be useful in making your process more efficient. And the PURIFIRE system is scalable: add data collection points wherever you deem necessary. The system's inherent flexibility will allow it to evolve and expand to meet your changing demands.

Benefit from our knowledge

In a specialized industry such as yours, you need to be supported by people who want to understand your business. Our team of process specialists, control and instrumentation engineers, metallurgists, and technicians has worked within the industry with virtually every metal treating process and furnace system. For over 30 years, Air Products has designed, built, and operated some of the most sophisticated process production plants in the world. We've developed industry-recognized expertise in process monitoring, communication, and control.

For more than five decades, we have been collaborating with customers to help them accomplish their profit, productivity, quality, and performance objectives.

Some applications of the PURIFIRE process management system

Utility consumption tracking

One common use of the PURIFIRE process management system is to help our customers understand and track their utility consumptions, including hydrogen, nitrogen, natural gas, and electricity, as well as all the furnace variables. They need this information because they are unsure which areas are using the specific utilities and in what amounts. Having this information allows them to better price their product based on actual costs per part as opposed to estimates based on assumptions.

Our solution consists of flowmeters to monitor the gas use points, including nitrogen, hydrogen, and natural gas consumption. Electrical usage is also tracked along with all the usual furnace variables. This allows the company to trend these data points on a continuous basis and pinpoint where the waste occurs during production.

The system provides typical labor savings resulting from automatic data collection and process monitoring. In addition, by optimizing their flow rates and usage patterns and by identifying leaks, customers are able to cut operating costs by almost 10%. The

information collected also helps them prioritize what projects need to get done in the future to further improve efficiencies.

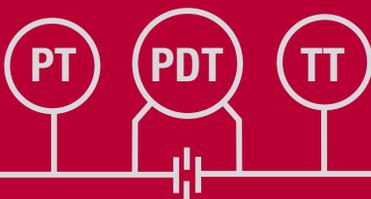
Furnace performance management

Other companies are using the PURIFIRE process management system to better understand and track the performance of their furnace, which involves measuring atmosphere compositions, temperature profiles, flow rates, atmosphere pressures, and other furnace parameters. By configuring the PURIFIRE system to measure these parameters, custom reports can be generated to identify trends and predict problem areas.

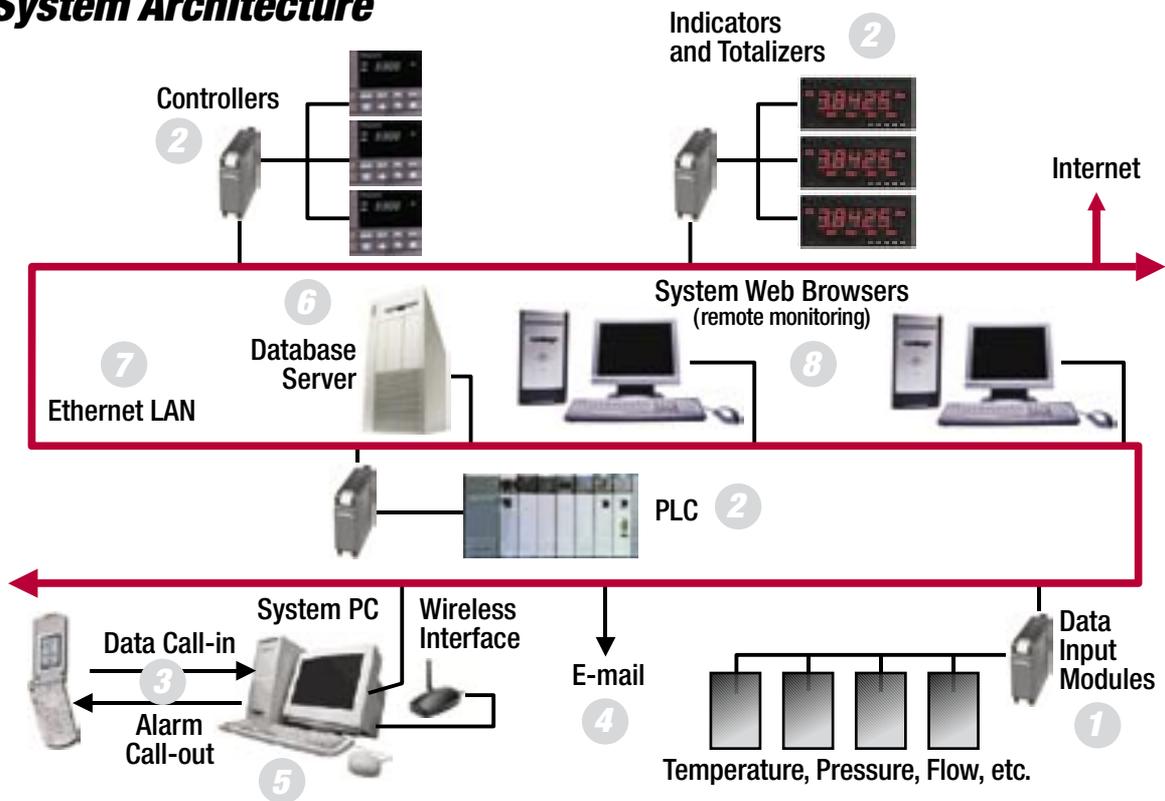
With solid information in hand, we can identify areas for improvement, such as reducing process variability, improving quality, reducing rework, and predicting maintenance issues. With this type of configuration, you may be able to lower labor costs by decreasing the manpower required to run the furnaces. Also, archived data collected through the system will supply you with a record of variables that you control and how they affect your parts—information that is increasingly being demanded by end users of your products.

“We’ve been using the PURIFIRE process management system to improve our annealing operation. Now we can monitor variables that give us a better picture of our process, which saves us time in process troubleshooting and improves overall quality control. As a result, we’ve reduced scrap and reprocessing costs by ensuring the proper parameters are maintained.”

Jill Stavarski
Process Metallurgist
Hamilton Precision Metals



System Architecture



The PURIFIRE system can easily integrate into your plant

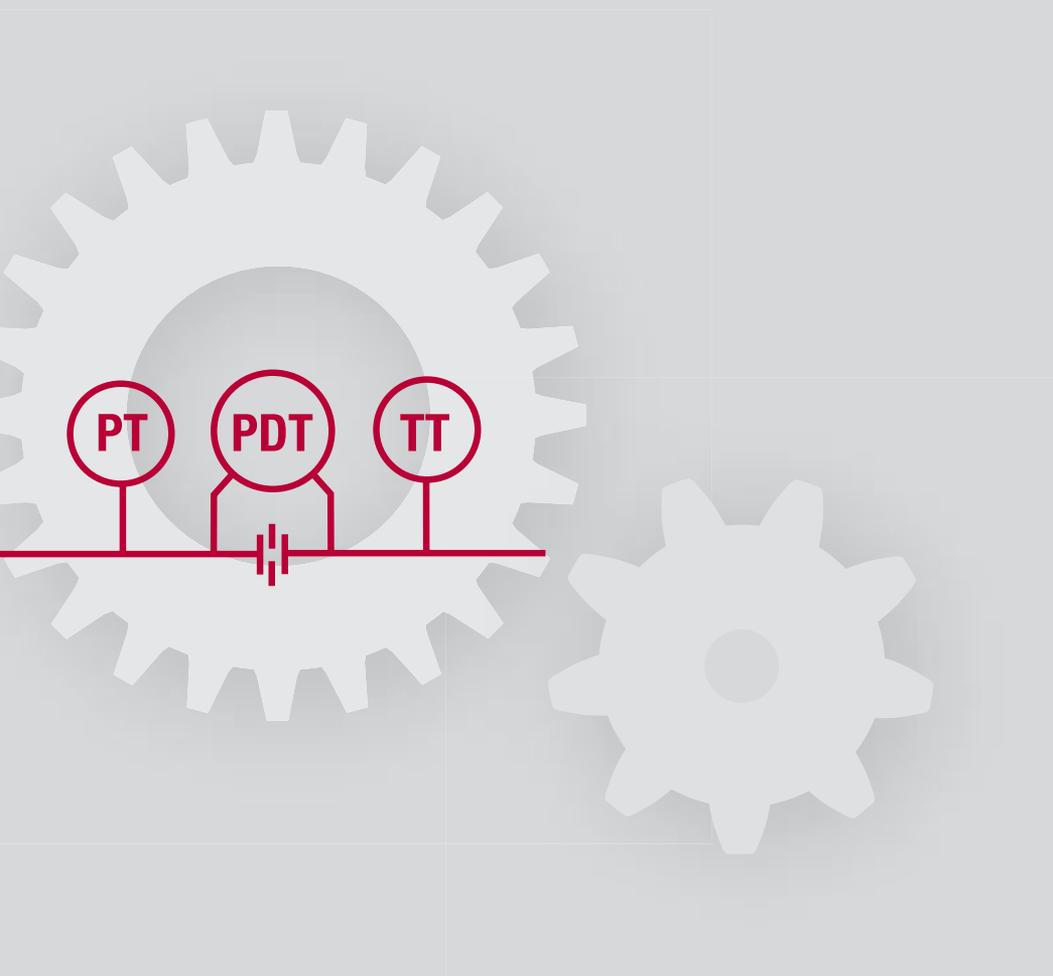
The PURIFIRE process management system consists of a Windows-based PC running our customized data acquisition software. The system is flexible enough to handle both small and large numbers of data points and easily integrates across your entire production operation.

- 1** We will install data input modules and connect them to your network. These modules accept analog and digital signals from the sensors to be monitored; for example, transmitters, thermocouples, and gas analyzers.
- 2** The system can also interface to your new or existing control devices, such as controllers, PLCs, indicators, and totalizers. Wireless links can be installed as needed.
- 3** A dedicated telephone line connected to your PC's modem enables automated alarm call-out and data call-in features.
- 4** When the system is configured with a mailbox on your e-mail system, it can send alarm notifications via e-mail. You can use this feature to send alarms to e-mail enabled cell phones and pagers.
- 5** You can access real-time data from any PC on your network, using a standard Web browser.
- 6** Your data is usually logged to the PC's hard disk, but you can also configure the system to log data to a database server.
- 7** Everything can connect directly to your existing local area network, which provides the communications path between the system and the devices being monitored in your plant.
- 8** In addition, real-time information from one facility can be viewed at another location through a dedicated intranet connection or through a standard Web browser.

For More Information

We are committed to making you competitive in a very competitive market. Contact us at the address below to schedule an appointment.

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