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DIFFERENT TGA SYSTEMS

HOW TO CHOOSE THE RIGHT TGA SYSTEM

A TGA system is one of the most powerful systems in a materials laboratory, but lots of users make the mistake of thinking it is simply a balance mated to a furnace. This is not at all the case, and for example Setaram currently make 5 completely different TGA systems all having totally different features making them uniquely suited to different applications, laboratories and industries.

SETSYS Evolution TGA

LABSYS evo

96 Line TGA

SENSYS evo TG-DSC

TAG

As such, we offer a simple step-by-step guide to assist you in selecting the correct instrument for your work now, and into the future.

STEP 1 - HOW MANY APPLICATIONS AND OPERATORS ARE PLANNED?

With any scientific instrument there is of course a compromise between performance and ease of use. The highest sensitivity instruments require skilled users and time for sample preparation. The same is of course true for TGA systems;
Top-loading TGA systems (like the LABSYS evo) are designed for labs where there are a high number of users with varying experiments. They feature good performance, but the design also enables for rapid and simple sample loading and a coupling system that can be utilized in seconds.
Other systems will offer enchanced performance, but the training required by the operator is typically more. So further consideration is needed, and you should start by understanding that any **TGA** system is built up of four main components, consider them individually because the selection of each will determine the final solution and ultimately the system that is right for you.

See more on the LABSYS evo

STEP 2 - WHAT KIND OF BALANCE…?

Take some time to take a look at the balance. Analytical balances are designed to deliver precise mass measurements in a few seconds. However, all TGA experiments take place over hours, and in some cases over days. As such, the key variable on balance performance is not detection limit, but drift over time. Just as important is to consider the sample type, and expected mass loss. These are typically the expected mass and mass change of your sample. A balance that is designed to measure small mass changes is not the same as one that can take a large sample with large mass changes.
All Setaram balances are designed to measure mass changes over long periods of time but there are currently four completely different balances in the Setaram range, and – for example – these can take typical samples sizes from 50mg all the way to 100g.

see the examples with corrosion

Oxidation behavior of alumina deposit on austenitic stainless stee

STEP 3 - WHAT ABOUT THE ATMOSPHERE CONTROL…?

Atmosphere control is also an obvious, but important feature to study when considering a TGA. All TGA use a combination of inert and active gas. But do you need vacuum, do you need controlled humidity, do you need corrosive gases, reducing gases or even hazardous gases?
Top loading systems are capable to tolerate 90% of all vacuum applications and some active gases but are not suited to aggressive and corrosive atmospheres. Systems such as the SETSYS Evolution feature sophisticated gas control systems and have options for corrosive gases and even high humidity gases. There is also an available option that allows for operation under 100% H2 and other flammable gases.

See more on the SETSYS Evolution

STEP 4 - LAST POINT ON THE FURNACE

The next component to consider is the furnace itself. Is it capable of performing all your experiments now, and into the future? Then consider the size of the homogenous temperature zone, related to your sample, is the control thermocouple optimized for your temperature range and can you change it ?

Finally, the software is your interface between the sample and the data. Does it do everything you need it to do – for example exporting graphs and data into papers and publications is almost essential in today's laboratory. However, consider something as simple as important your existing data so you can overlap historical data with new data, different and simple baseline operations, integrations and blank subtractions. Today some systems do not give you raw data, but data that has been treated to give artificially flat baselines and do not allow for peak separations. All of these functionalities are really important for your day-to-day operations.

CONCLUSION

Now, you have considered all of these variables….What next?

Well, my advice is straightforward. This is a big investment, and will be a critical tool in your research. You would not purchase a car without test driving it…..so run a sample in the vendor's laboratory. We all offer this service, and you should take advantage of it. It is in fact the only way you can be sure that your sample can give you the data you want. But, just a hint. Make sure you get the raw data. As I said, the software can present pretty curves and this means a little 'polishing' might been performed.

Gary ETHERINGTON
Sales & Marketing Director

www.setaram.com

Offices in United Kingdom, Germany, China and Russia

SETARAM INSTRUMENTATION
Caluire - France
Phone +33(0)4 72 10 25 25

SETARAM INC
Hillsborough, NJ - USA
Phone +1(908) 262 7060