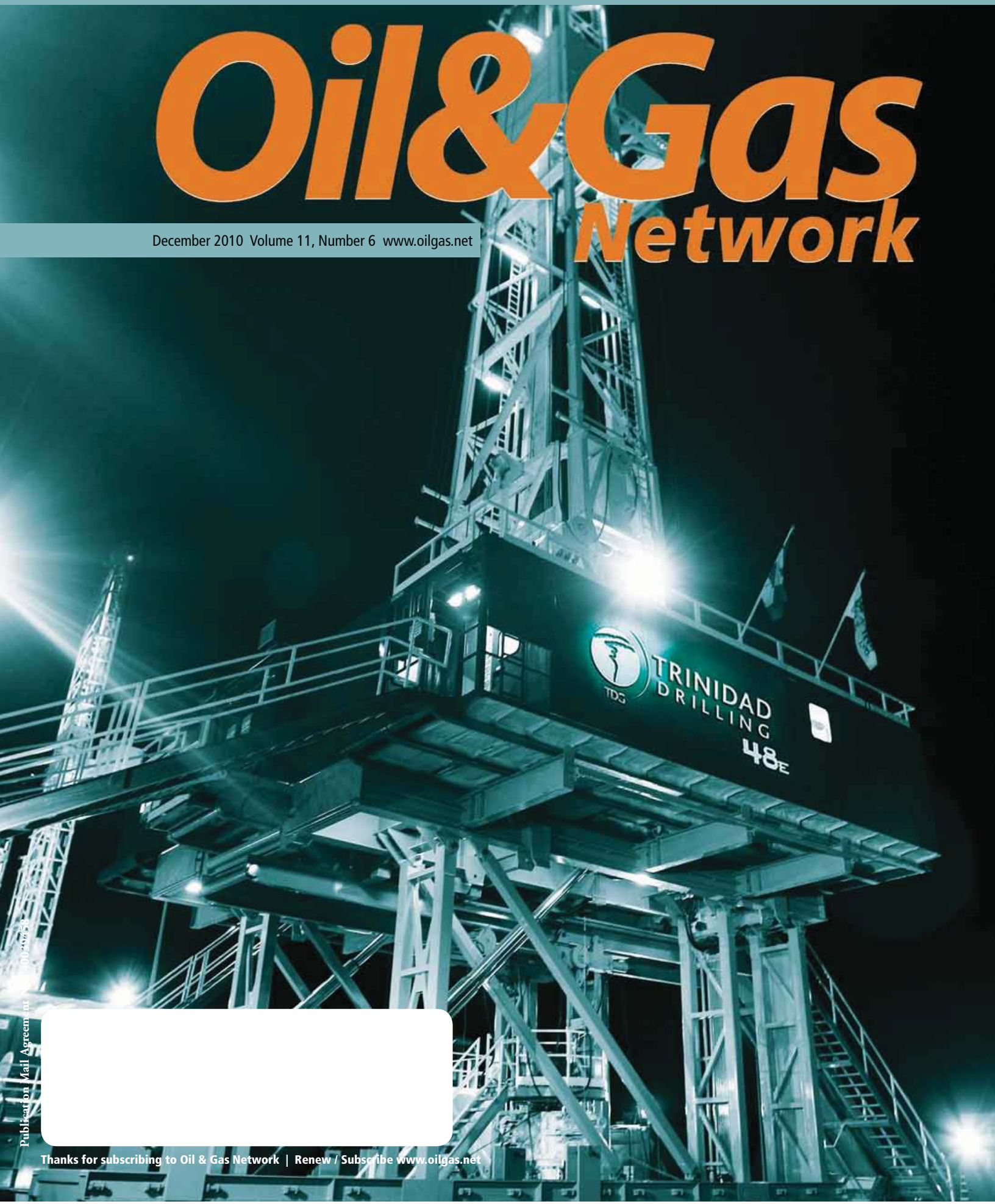
Oil&Gas Network

December 2010 Volume 11, Number 6 www.oilgas.net



Publication Mail Agreement

Oil&Gas Network

Publication Mail Agreement No.: 40039458

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Oil & Gas Network Mail
2 - 1450 28th Street, N.E.
Calgary, AB T2A 7W6

Printed in Canada by
Calgary Colorpress

CONTENTS

December 2010 Volume 11, Number 6

Cover photograph courtesy of Trinidad Drilling and Impact Graphics.

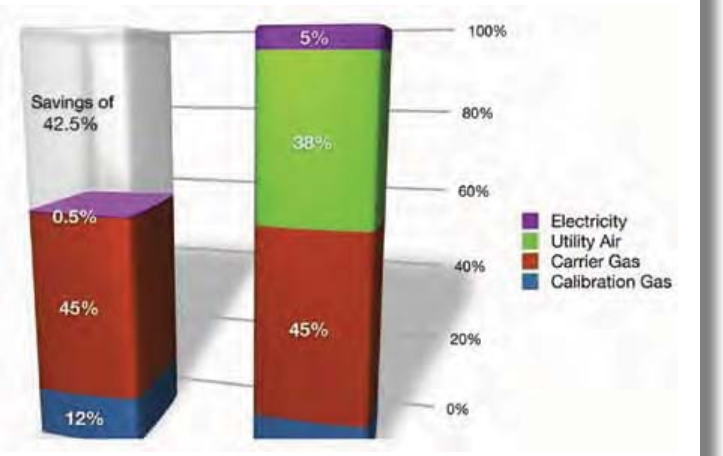
Choice of Gas Chromatograph Ovens and Shelters Impacts Cost of Ownership

By Michael Gaura, Product Marketing Manager, Emerson Rosemount

When industry professionals scope out a new capital analyzer project, they spend time and effort evaluating the equipment to be used. In the case of gas chromatographs (GC), key capital expenses – the oven associated with the GC and the shelter that houses it – may not be considered in the final decision, often because managers do not realize they have a choice. In fact, these decisions can have a huge impact on the cost of ownership of the analysis equipment, with the potential to significantly reduce costs at initial installation, in operation and maintenance and in the execution of change orders.

Airless vs. Air-bath Ovens

When analyzing gas chromatographs, industry professionals should understand that they have a choice of newer airless ovens and traditional air-bath ovens. In a majority of situations, the airless ovens will help to reduce operating expenses. Air-bath ovens rely on plant or compressed air to heat the analytical oven to a constant and optimal temperature, which means a temperature above the dewpoint and optimized for component separation. The incoming air must be heated to maintain the constant oven temperature and must also be hydrocarbon free, to prevent any explosive risks. Airless ovens don't require expensive air sources and consequently consume less power as they do not need to heat any incoming air that is often much cooler than that inside a traditional air-bath oven. In fact, in most applications, an airless oven can reduce overall operating costs by over 40 percent. (See Fig. 1) Airless ovens often require less maintenance as the heating element for incoming air frequently fail, and are not present in airless ovens. This results in less downtime than air-bath ovens, ultimately increasing valuable service time. Airless ovens also take up less space, which combined with the reduced energy requirements, makes them well-suited for most process applications. In a small percentage of applications, the traditional air-bath oven may be more appropriate, though, based on oven heating requirements.



Operating expenses for airless and air-bath ovens

Options in Shelters

Analyzer shelters can be one of the largest expenses associated with any analytical solution. Users often don't realize that they have other options in shelters – a "walk-in" analyzer house, a cabinet, a three-sided shelter or sunshield, and a field-mounted gas chromatograph. Each has appropriate applications and the following are some comments on the three most common analyzer installation arrangements found in plants.

Analyzer Houses – An analyzer house is ideal for plants in extremely hot or cold climates and where the safety and comfort of employees is a key consideration. At the same time, complete analyzer houses are the most costly option by far. In addition to the need to build an expensive enclosed structure, there are many additional costs, some of them hidden. These can include high engineering (third-party and internal) costs, increased shipping costs, extensive cabling and tray requirements, increased assembly and installation costs, high maintenance fees, more required spare parts, and high utility and power consumption charges. In addition, because an analyzer house can potentially entrap hazardous gases, additional capital expenditures may be required. These can include hazardous area compliance, safety systems, and fire and gas detection systems. The overall costs mount to the tens of thousands of dollars, not including personnel time.

Three-sided Shelters or Sunshields – Three-sided shelters are designed with an open structure so they provide some protection from elements but are not appropriate in the extremes of weather. Due to their design, they require no HVAC equipment and there is no risk of entrapping hazardous gases, so safety systems or fire and gas detection systems are often not required. This saves costs. Since the shelters are lighter weight than an analyzer house, shipping costs are lower. There are, however, still capital expenses associated with cabling and trays, assembly and installation, maintenance and spare parts. All of these add up, but are still significantly less than the analyzer house costs.

Field-mounted (shelterless) installations – Field-mounted gas chromatographs are designed with flameproof and weatherproof enclosures allowing them to be installed with no shelter. This means that the GC can be mounted closer to the sample point, reducing sample line run lengths. This can ultimately result in reduced volume of sample required, reduced costs in installation and hardware, and in installations requiring heated lines, reduced utility requirements. Often, these analyzers are tested in environmental chambers to assure their robustness in extremes of temperature. Obviously, in the right applications, these GCs provide the greatest CAPEX and OPEX savings. There are no shelter-related expenses, and in most cases, the required cabling is minimal. Shipping expenses are very low, and assembly and installation can be done by any experienced analyzer technician – no special construction or assembly personnel are needed. Because these GCs are designed for field conditions, they generally require very little maintenance and use fewer utilities – such as plant air and electricity that can ultimately be quite expensive. They are significant cost-savers in any application where weather or other environmental extremes are not an issue.

In environments where field technicians require protection from extremes of weather, analyzer houses will be required. Interestingly, the best ROI in such applications may still be a field-mounted GC. This type of device offers the most flexibility in handling changes in the analytical structure. If the user needs to add one or more analyzers at a later date, the field-mounted instruments give the potential to expand without spending hundreds of thousands of dollars on a new analyzer house. The field-mountable GC can be moved out of the structure to make room for more environmentally sensitive equipment. Upgrade projects also benefit from this flexibility, allowing a field-mountable instrument to be added to an existing system without the need for construction of a new enclosure. Existing structures – even those that may no longer have fully operational HVAC systems – can be reused and the demolition of old analyzer houses and the costly design, purchase and installation of new ones are avoided.

The right analyzer is always unique to the application. Users need to consider all of the potential expenses involved with that choice – immediate and long-term, obvious and hidden – in order to understand the ultimate return on investment.

Michael Gaura is a Product Marketing Manager for Emerson Process Management's Rosemount Analytical. He has spent nearly 10 years working with gas analyzers in a variety of capacities and has earned degrees from Purdue University and Oklahoma State University. More information can be found at www.rosemountanalytical.com.