

SEALING SENSE

Are you playing offense or defense with your Leak Detection and Repair?

A major concern of U.S. petroleum refineries and chemical process plants is regulatory compliance. Federal, state, special regulatory district and consent decree mandates require compliance of all regulations with the 1990 Clean Air Act (CAA). Petroleum refineries were an early priority target for the EPA. It is likely that chemical process plants will become the next focus of EPA attention.

The natural defensive reaction to regulatory pressure is to prepare for compliance and audits. The ease with which requirements will be fulfilled will depend on how well these outside forces are understood and anticipated.

Leak Detection and Repair (LDAR) is a key process for affecting industry compliance with the CAA. The offensive and defensive natures of LDAR are summed up in this oft cited quote of an LDAR contractor to an EPA inspector, "We monitor, you look for leaks!"

Is Your LDAR Program Offensive or Defensive?

We all need to comply with regulations. There are approaches, products and technologies that any refinery or chemical processor can use that will manage this necessity. LDAR simply means detecting leaks and stopping them. The process considers:

- What is to be done
- How it is to be done
- How it is proven that it has been done
- How the system that keeps emissions in check is maintained

None of us would argue that stopping volatile organic compounds (VOCs) from leaking is the right thing to do. None of us wants to pollute our air, water and land. Instead of simply reacting to regulatory compliance, consider these good offensive actions that will make compliance easier, more cost effective and minimize the defensive attitude that surrounds LDAR.

A New Way to Find Leaks

Today, single point organic vapor analyzers (OVAs) and toxic vapor analyzers (TVAs) are used to monitor each possible point of VOC emissions. EPA Method 21 determines the



Figure 1.
Infrared leak detection

(Photo courtesy of FLIR Systems, Inc.)

use, calibration and maintenance of the instruments. During the past few years, optical methods using infrared (IR) cameras have been evaluated for detecting leaks. This method involves the use of a handheld IR camera that visually displays leakage as it is happening.

The leakage appears on the camera screen as dark smoke coming from the point of leakage. The smallest leaks the cameras detect are in the range of 5,000- to 10,000-ppm. New versions are now available offering visuals of lower leak concentrations. The EPA's proposed method for using this new technology has been published for review in the Code of Federal Regulations (CFR) and is commonly referred to as the alternative work practice (AWP); it is yet to be finalized. It is being tried as an alternative and complement to single point vapor analyzers.

The biggest advantage to the optical method is that many components can be viewed in a short amount of time and the largest, most environmentally destructive leaks are readily found. With this knowledge, repairs can be prioritized to stop the worst offenders sooner. This approach is a positive move toward proactive, offensive LDAR.

Equipment Sources

Pumps, compressors, pressure relieve devices, sampling connections systems, open ended lines, valves, flanges or other connections are all subject to potential leaks that require detection. Figure 2 shows where the greatest opportunities are to reduce fugitive emissions.

Valves present the greatest opportunity for reducing fugitive emissions. Each valve can have up to four or more possible emissions centers—a bonnet gasket, two flange gaskets and the valve stem packing. Other possibilities are ports and taps that may be found in the body, gland or flanges of the valve.

Sealing Solution: The Best Offense

Given this information, the focus should turn to the valve stem packing set and its flange gaskets. Here is the recommended procedure:

Work with a Reputable Manufacturer

Communicate directly with the technical engineering and customer service staff of the sealing product manufacturer. Manufacturers commonly work through distribution networks that provide immediate and valuable local service and support, but the application know-how and support for the product itself lies with the manufacturer. The application engineering and customer service functions are the points of contact.

Obtain the Flange and Valve Service Information to Select the Best Sealing Products

This information includes temperature, temperature cycling, pressure, media, actuation frequency and valve type (air operated control valve, block valve, etc.). This will point the applications engineer to the right product for regulatory compliance and long life. The state of the equipment is equally important. For example, the best valve stem sealing system in the world will not perform well if the stem is bent or abraded.

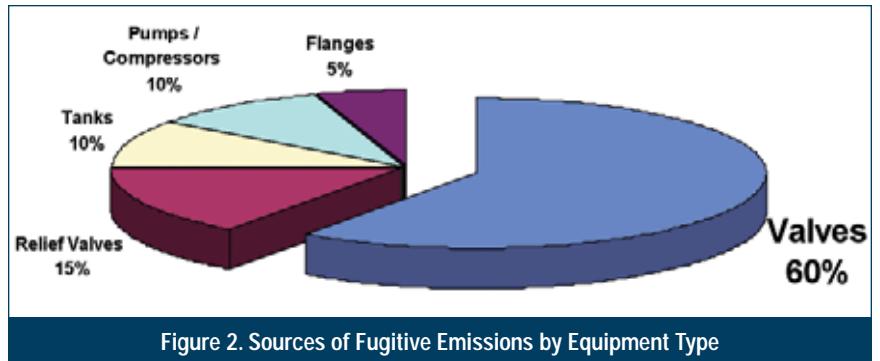


Figure 2. Sources of Fugitive Emissions by Equipment Type

What Is Your Criterion for Packing and Gasket Performance? Do You Have One?

There are a number of published standards and guides. API 622 and ISO 15848 are the most well known for valve stem packing. API 622 was introduced in 2006 to provide standard test methods for fugitive emissions, corrosion and physical characteristics of valve stem compression packing, independent of the valve type. ISO 15848 qualifies the whole valve with its sealing components. Unlike API 622, which prescribes test methodology only, ISO 15848 prescribes testing and also grades the performance of the stem packing.

Other standards include those of Germany's TA-Luft (qualifications for packing and gasket performance), Instrument Society of America (ISA) and Manufacturers Standardization

Fluid Sealing Association

Sealing Sense is produced by the **Fluid Sealing Association** as part of our commitment to industry consensus technical education for pump users, contractors, distributors, OEMs and reps. *This month's Sealing Sense was prepared by FSA Member Jim Drago, P.E.* As a source of technical information on sealing systems and devices, and in cooperation with the **European Sealing Association**, the FSA also supports development of harmonized standards in all areas of fluid sealing technology. The education is provided in the public interest to enable a balanced assessment of the most effective solutions to pump technology issues on rational total Life Cycle Cost (LCC) principles.

The **Compression Packing** division of the FSA is one of five with a specific product technology focus. As part of their mission they develop publications such as the joint FSA/ESA *Guidelines for the Use of Compression Packings* and *Pump & the Valve Packing Installation Procedures* pamphlet. These are primers intended to complement the more detailed manufacturers' documents produced by the member companies. In addition to English, they are available in a number of other languages, including Spanish and German.

The following members of the **Compression Packing** sponsor this *Sealing Sense* series:

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Society of the Valves and Fittings Industry (MSS). Individual companies will also author performance specifications for valve stem packing and gaskets, based on a prescribed set of test requirements, as a condition of purchase.

Look at the Total Value of the Sealing Solution

“An ounce of prevention is worth a pound of cure,” so the

saying goes. This saying also applies to LDAR. The dollars and time spent at the beginning of the process on sealing product selection and installation will yield savings in avoided emissions, non-compliance penalties, unplanned downtime and drill and tap expenditures, just to name a few. In many cases, the associated cost of valve replacement can be avoided. The value of this partial list of cost savings can run into the hundreds of thousands of dollars.



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Product Warranty and Performance Guarantees

A warranty gives assurance of the quality of the products you are trusting. Warranties guaranteeing a certain level of emissions performance are available. Discuss the warranty terms with the seal manufacturer. Since valve packing (and sealing products in general) is installation and equipment sensitive, there are conditions that need to be met to qualify issuance of performance guarantees.

Offensive Sealing Solutions – Keep a Score Card

Data management is a key element of regulatory compliance. In addition to its use in required reports, it provides meaningful metrics on reliability and improvements. Data on emissions, component specifications and repair history can yield trends pointing to the best sealing products, valves and practices for optimum performance.

A proactive approach to LDAR sealing requirements will help satisfy the letter and spirit of environmental regulations. Preventing leaks by good sealing practices before they become pollution and compliance issues is good offense that will save you money.

Next Month: *Who should recondition my seals?*

We invite your questions on sealing issues and will provide best efforts answers based on FSA publications. Please direct your questions to:

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