



## Eliminate the need for equipment to be offline or the unit to be shutdown whilst searching for a leaking exchanger.

### A Tracerco leak test. What does it do?

Tracerco has a long history of performing online and off-line heat exchanger leak testing using chemicals, radioisotopes and helium as tracers. A Tracerco Diagnostics™ Leak study provides real time data on the exchanger and eliminates the need for the equipment to be off-line or the unit to be shutdown while searching for the leak. It also reduces maintenance costs as it identifies the individual leaking exchanger in a “bank” or group of exchangers, avoiding the need to perform unnecessary maintenance on multiple units.

### What type of tracer materials are injected into the process system?

The Tracerco team of experts will work with a customer to select a suitable tracer material for the leak test based on a series of process questions:

- How many exchangers?
- How small a leak size may be present?
- Are there injection and sample points downstream of the vessels?
- What are the phases and compositions of the streams?
- What are the temperatures, pressures and flow rates of the streams?

Radioisotope tracers used can either be gas or liquid phase. A very small volume of tracer, typically about 30 to 50 ml, is injected into the system. Radioisotope tracers typically have very short half-lives.

The minimum detectable leak size with external detectors is usually around ~0.5%. Leaks as small as 100 ppm (0.01%) can be found with radioisotope tracers using a sampling technique.

Tracerco offers a range of proprietary chemical tracers. They are non-hazardous, non-flammable, and very stable.

The volume of tracer typically injected is 100 ml to 1000 ml. The tracers chosen will closely mimic the characteristics of the process being studied. Samples of the process fluid are collected and analysed at a Tracerco laboratory. The minimum leak size measurable with this technique detects leaks as small as 10 ppm (0.001%).

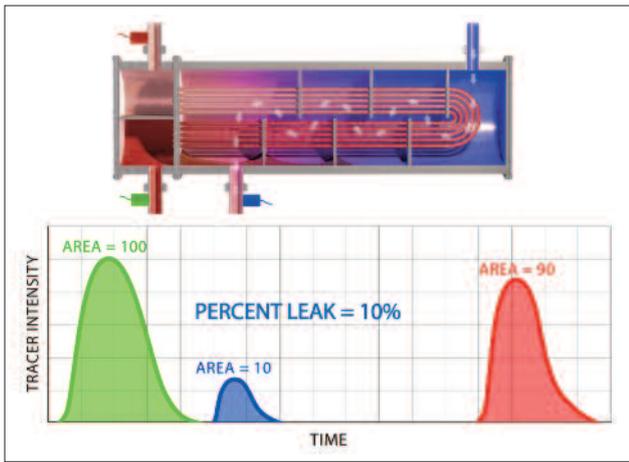
### What preparation is needed to perform an exchanger leak study and how will the tracer be injected into the process equipment?

The site requirements include a suitable injection point on the primary inlet line into which the pulse of appropriate tracer can be injected. If samples are to be taken, a process must have a suitable point downstream of the suspect vessel(s) from which samples can be taken. The injection point can often be a 2cm (¾ inch) bleeder near a control valve.

A good set of Process and Instrumentation Diagrams (P&ID) is needed prior to performing the leak test so the appropriate injection and sample positions can be determined.

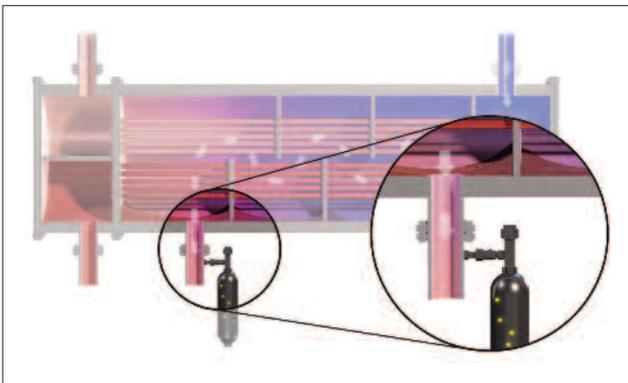
### How is an exchanger leak study performed?

The standard technique is to mount sensitive radiation detectors on the feed and effluent lines of each exchanger and inject a radioisotope tracer that is compatible with the feed stream. As the tracer flows into the exchangers with the higher-pressure feed stream, the detectors on the feed piping will respond to the passage of the tracer, producing Gaussian response curves on the computer. If one of the exchangers has a leak, detectors on the effluent exit lines will respond, producing a response curve. By comparing the area under the leak detector response curve to the area under the feed detector response curve, the percentage leak can be approximated. This technique is the easiest and quickest way to perform an online leak test if 0.5% or more of the feed is leaking into the effluent.



Smaller leaks can be found with radioisotope tracers by a sampling technique. The tracer material and injection procedure are exactly the same as before, but instead of mounting detectors on the feed and effluent lines, sample points on the effluent lines have to be established. Sample points generally consist of a sample cooler where hot effluent is condensed/cooled and collected in sample containers. The samples are counted with a very sensitive radiation detector over several minutes. Compared to the online tracer technique where the tracer material flashes past the detector in a few seconds, much smaller amounts of radiotracer can be measured in the samples through accumulation of counts over time. This technique has been used to find leaks as low as 100 ppm (0.01%).

The technique for chemical tracers is virtually identical to the radioisotope sampling technique, except in the sensitivity of the analysis. A number of chemical tracers are available that are compatible with organic liquid or vapour streams and can readily be detected in samples by specialised gas chromatography. The chemical tracers are injected into the system and samples are collected in several sample cylinders over a short time period. Samples are delivered to a local Tracerco laboratory where they are analysed for tracer content. This technique has been used to find leaks as low as 10 ppm (0.001%).



## How safe is this procedure?

We offer the safest, highest quality and most accurate Process Diagnostics™ service available. Our procedures ensure we comply with regulatory requirements to protect all plant personnel. We segregate a small area around the injection point, but do not need to restrict access to the equipment being tested. Our crew members are always very willing to explain these procedures with everyone potentially affected and to be sure we do not block access to critical areas. There is no danger to plant personnel working around process equipment, as long as they stay out of the barricaded area.

## What about radiation protection?

Tracerco employs full time Radiation Professionals to ensure regulatory and licence compliance. Tracerco is licensed by appropriate agencies worldwide. Most field staff are trained to the Radiation Protection Supervisor (RPS) level.

## What are your limitations for leak testing?

Tracerco is licensed by multiple regulatory agencies to be able to provide products and services to our customers worldwide. Where we are not currently licensed we will work with local authorities to acquire temporary permissions. Based on regulatory and licence conditions within each country, there will be imitations on what radiation isotopes and maximum source sizes can be used to perform gamma scan and tracer projects. A Tracerco representative can discuss any restrictions or limitations that may impact the feasibility of projects within different countries.

## What information will the Tracerco Diagnostics™ Leak study results provide?

After a Tracerco Diagnostics™ Leak study has been completed the lead crew member will leave a preliminary report with the customer before leaving the plant site. A formal report will be provided soon afterwards.

A Tracerco Diagnostics™ Leak study is used to assist our customers when they are seeing evidence suggesting the presence of a leak; such as a drop in process efficiency or the presence of a contaminant in product. This raises the question of where in the plant the leak is occurring or is the off-spec material due to some other problem.

A few of the benefits an exchanger leak test provides include:

- Real-time measurements.
- Eliminates the need for traditional methods of shutting down the unit or bypassing the equipment to find the leak.
- Significantly reduces the maintenance and lost production costs associated with confirming and locating a leaking exchanger.

For further details email: [process.diagnostics@tracerco.com](mailto:process.diagnostics@tracerco.com) or visit: [www.tracerco.com/processdiagnostics](http://www.tracerco.com/processdiagnostics)

For our worldwide offices: [www.tracerco.com/processdiagnostics/our-people](http://www.tracerco.com/processdiagnostics/our-people)

Enabling you to make the right decision

