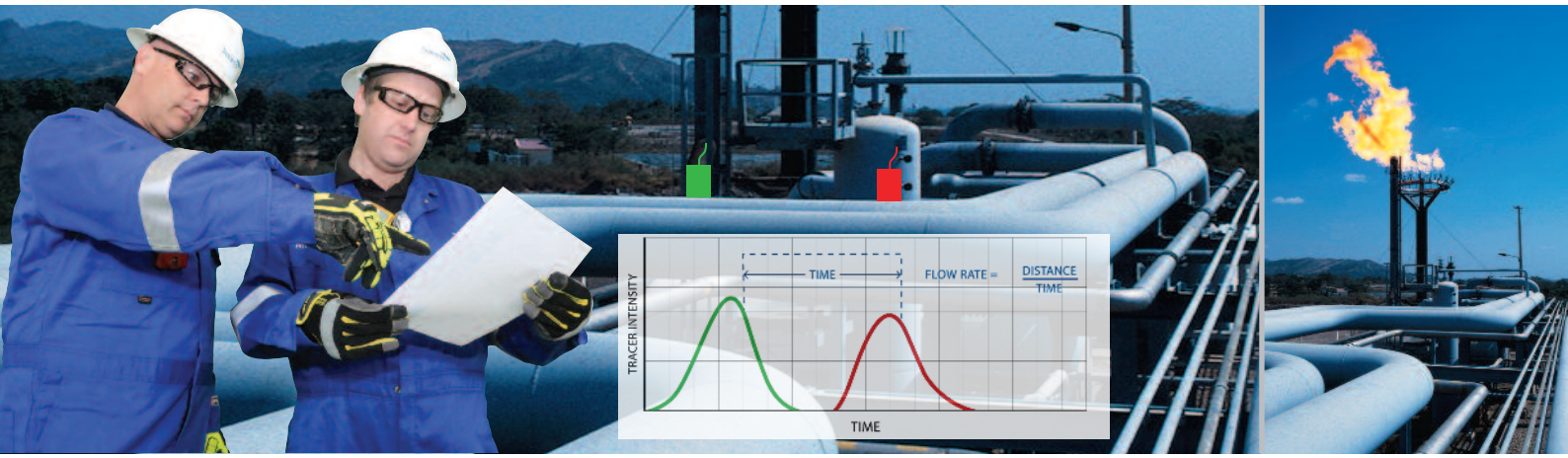
Tracerco

Providing Insight Onsite



A rapid and cost effective method of determining flows of gas, water, and organic based materials.

Tracerco flowrate study. What does it do?

Tracerco Diagnostics™ Flow studies measure flowrates through flare lines or piping systems, monitor process changes over start-up/shutdown cycles and determine leakages past relief valves or block valves. Our flow study technology offers a rapid, accurate, and cost effective method of determining flows of gas, water, and organic based materials.

What type of tracer materials are used to perform the testing?

Tracerco's team of experts will work with the customer to select a suitable tracer material for the equipment based on a series of process questions to determine the appropriate radioisotope needed for the testing. An example of a few of the questions asked include:

- What are the phases and compositions of the streams?
- What are the temperatures, pressures and flow rates of the streams?
- What is the size of the pipe?
- How accessible is the pipe?
- Is there an injection point?

Radioisotope tracers can be in the form of solids, liquids, or gases and can be detected using radiation detectors mounted externally to the pipe. Typical isotopes used for testing have short half-lives. Tracerco is licensed by various agencies worldwide to possess and use radioisotope tracers at our clients' sites.

What preparation is needed to perform a Tracerco Diagnostics™ Flow study and how will the tracer be injected into the equipment?

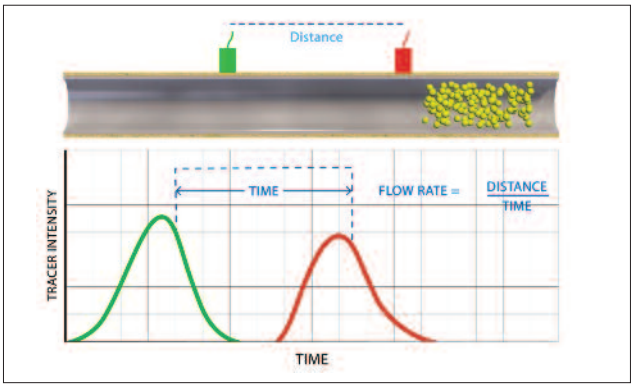
Studies can be performed on any pipe diameter and there is no need to remove any insulation to perform the flow study.

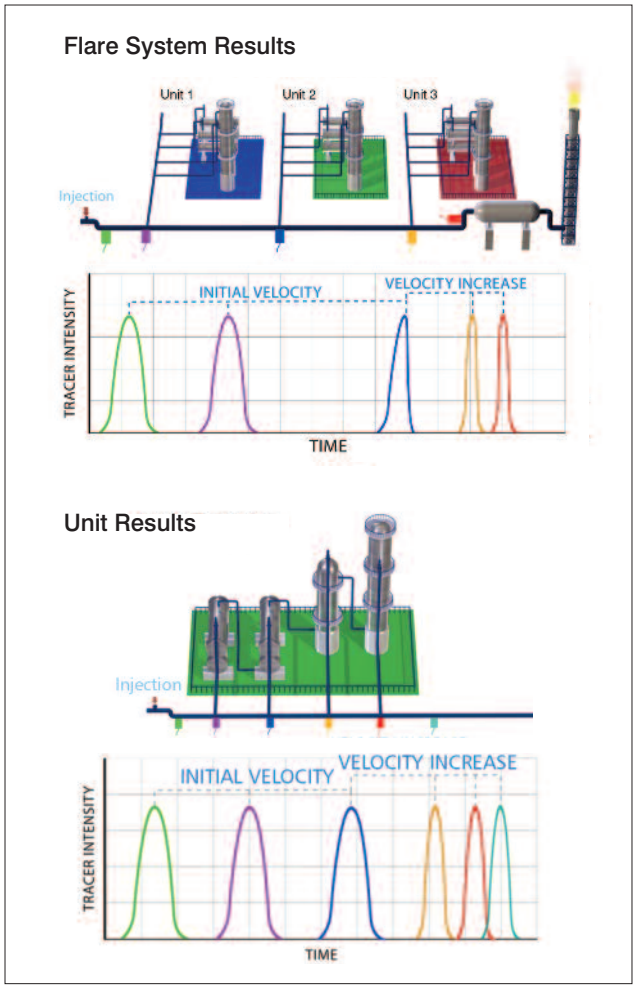
The site requirements include a suitable injection point upstream of the detector placement into which the pulse of appropriate tracer can be injected. The injection point can often be a drain point near a control valve, a pressure gauge tap or some other suitable nozzle to inject the tracer into the process line.

A good set of Process and Instrumentation Diagrams (P&ID) is needed prior to performing the flow study so appropriate injection points can be determined.

How is a Tracerco Diagnostics™ Flow study performed?

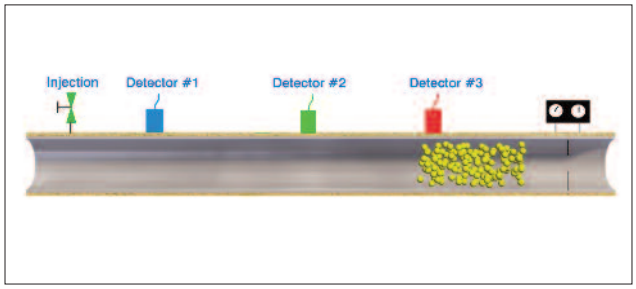
The most standard technique (Pulse Velocity) is to mount two or more radiation detectors on the outside of the pipe. A sharp pulse of tracer that is compatible with the gas, liquid, or solid in the pipe is injected into the process stream. The tracer mixes radially in the pipe and flows at the same velocity as the fluid. As the pulse of tracer passes each detector, the response is recorded. The time between the centroids of the response curves is the mean transit time of the tracer between the detectors and from this and detector separation, the flow velocity is calculated.





Tracerco Diagnostics™ Flow study technology is used to measure flow in flare systems in order to locate sources of fugitive flow. Once it is determined which unit(s) are contributing to the flare flow, each PSV, block valve or relief valve can also be individually tested to determine which is leaking.

Tracerco has developed an onsite meter proving technology based on the pulse velocity method that can accurately determine instantaneous flow velocities to prove the accuracy of flow meters onsite in various applications such as critical process flow meters and custody transfer meters.



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 work 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 staff are trained to the Radiation Protection Supervisor (RPS) level.

What are the limitations for flare flow rate 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 limitations on what isotopes and maximum source sizes can be used to perform flow 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™ Flow study results provide?

After a Tracerco Diagnostics™ Flow 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™ Flow study is used to help our customers determine flow velocities, to isolate where flare flow is coming from within a flare line system, to verify and calibrate meters, and to provide an independent verification that data reported for environmental purposes is correct.

A few of the benefits a Tracerco Diagnostics™ Flow study provides include:

- Information on where excess gas is entering a flare system - on a unit or equipment level
- Determine the volume and thus the value of the material being lost to the flare
- Monitor process changes over start-up/shutdown cycle
- Determine leakage past relief valves or block valves
- Perform mass/flow relationships through flare lines or piping systems
- Verify and calibrate meters

For further details email: **process.diagnostics@tracerco.com** or visit: **www.tracerco.com/processdiagnostics**

For our worldwide offices: www.tracerco.com/processdiagnostics/our-people

Enabling you to make the right decision

Process Diagnostics

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