



## Obtain a quantitative analysis of packing maldistribution, detect carry over/under issues and identify damaged internals.

### How can a Tru-Grid™ Scan help optimise my gas conditioning system?

A Tru-Grid™ Scan in a gas conditioning system provides a density profile of the process inside the tower. The power of the technology is that the scan is done whilst the tower is operating so real-time information about how the tower is performing at that instant is obtained. The scan “sees through” the vessel wall allowing determination of what is happening inside without the need to shut down. The scan produces information that cannot be obtained by any other means.

### What information will the Tru-Grid™ Scan results provide?

Tru-Grid™ Scan technology is used to evaluate the quality of liquid phase distribution and verify the placement of packed beds and distributors. It can help diagnose problems such as fouled or crushed packing, overflowing distributors and collector trays, flooding and foaming.

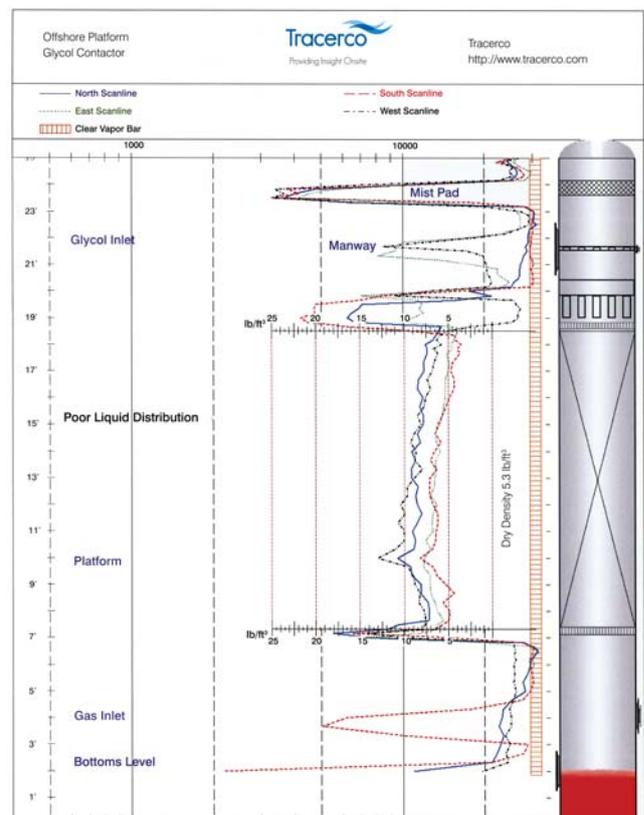
Benefits of a Tru-Grid™ Scan include:

- Determine process issues that might be easily remedied by a change in operating procedures
- Detect the presence of flooding and determine the exact location and its probable cause, allowing the best course of action to be chosen to alleviate the problem
- Confirm position and operating condition of packed beds and other major internals allowing preparation of equipment and field services for any necessary repairs in advance, minimising downtime, emergency expenditures and lost production

### PackView™? What is that?

PackView™ technology provides a quantitative measure of the liquid distribution through packed beds on a liquid retention

scale, expressed in density units. The density scale represents the density of the liquid retained in the packing. The fraction of liquid hold up or liquid volume fraction through the packed bed can be calculated by dividing the retained liquid density by the actual (at operating conditions) liquid density in the packed bed.



The measured hold up can be directly compared with the calculated hold up based on packing types and process parameters.

The ability to quantify liquid hold up improves diagnostics to:

- Better quantify liquid maldistribution
- Better determine the extent of liquid flooding
- Better determine the packing capacity relative to hydraulic flood

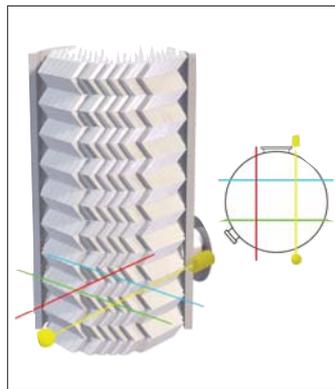
### What preparation to the tower is needed before a Tru-Grid™ Scan is performed?

A Tru-Grid™ Scan is generally performed without any preparation to a vessel, e.g. no insulation needs to be removed. The scanning equipment used is very portable and the crew can carry in back packs. They will need access above the section to be scanned either by ladders or scaffolding.

Good drawings, especially showing the orientation of internals is needed prior to performing the scan so the appropriate scanline orientation can be used.

### How is a Tru-Grid™ Scan of a packed tower performed?

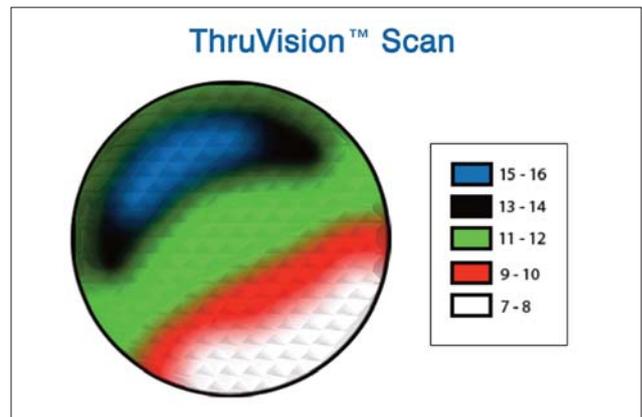
A Tru-Grid™ Scan measurement is typically performed using a very small (activity) sealed radioactive source and a sensitive radiation detector. Whilst the column is online and operating at normal, test or upset conditions four scans are performed using a grid consisting of pairs of parallel scanlines orientated ninety degrees to each other. Any external obstructions are noted to make sure they do not affect the scan interpretation.



### ThruVision™ - The next step to investigate liquid maldistribution.

In some cases, a Tru-Grid™ Scan may appear to show no major problem but symptoms may persist. For example, annular flow against the wall of a column, or down through the center may appear as uniform liquid and density distribution on a Tru-Grid™ Scan, but can be detected by a ThruVision™ scan.

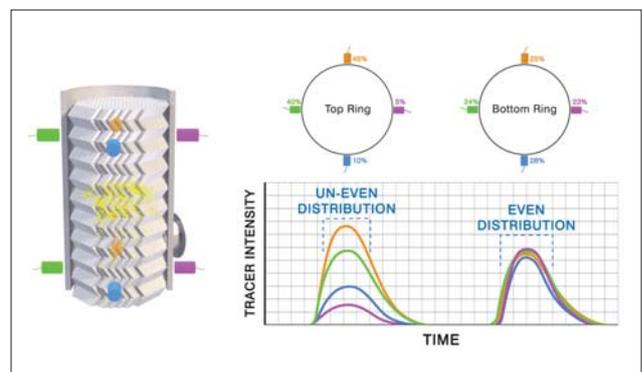
ThruVision™ is a 360° scan performed at a single elevation using multiple and overlapping source/detector positions. It produces a detailed contour map of the liquid distribution inside the tower and can help identify a more complicated problem that may be proving difficult to identify using other techniques.



### How is a Tracerco Diagnostics™ Distribution study performed on packed beds?

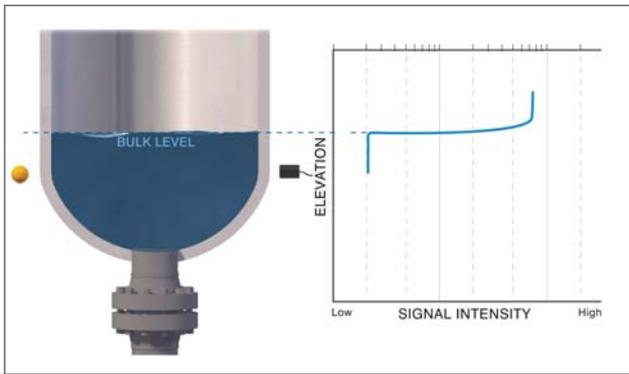
A Tracerco Diagnostics™ Distribution study is typically used for determining potential carryover/carryunder or maldistribution of liquid or vapour but the density change is so small that it cannot be detected by a Tru-Grid™ Scan or ThruVision™.

A liquid or vapour distribution or carryover/carryunder study using a radiotracer is performed by positioning a number of detectors around the packed bed at key locations along with detectors on the inlets and outlets. A small amount of a suitable tracer material is injected into the vessel that will follow the phase under investigation and the response of each detector is measured. Analysis of each detector response allows flow dynamics to be determined including cross-sectional distribution and velocity.



### What information will a Tru-Scan™ provide?

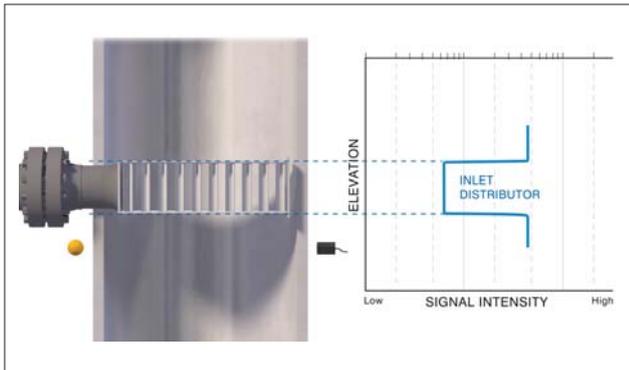
A Tru-Scan™ will provide a bulk level measurement in addition to identifying damaged internal hardware such as an inlet distributor. The power of the technology is its ability to offer real-time information about vessel internals and performance. A Tru-Scan™ measurement is typically performed using a very small (activity) sealed radioactive source and a sensitive radiation detector aligned on opposite sides of the vessel. The scan is performed whilst the vessel is online and operating at normal, test or upset conditions. Any external obstructions are noted to make sure they do not affect the scan interpretation.



## How safe is this procedure?

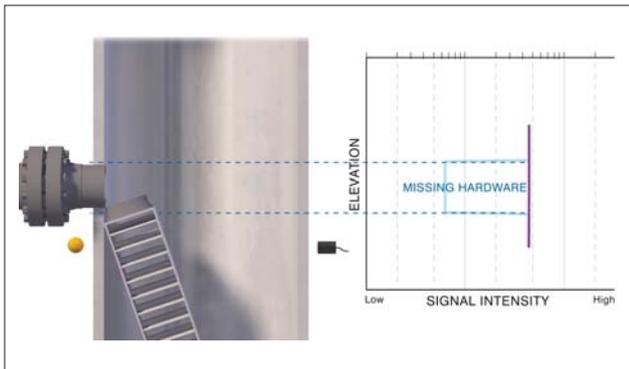
We offer the safest, highest quality and most accurate Process Diagnostics™ service available. The features of our system include:

- Low-voltage scanning detectors and electronics to minimise risk
- A wireless detector system means no danger from co-axial cables getting burned or stuck on tower structures
- Our customised detection equipment provides a more focused diagnosis, detecting subtle but important problems that might be missed using other technology



## What about radiation protection?

Compared to industrial radiography (X-rays of welds and piping) we use much weaker radioactive sources - typically a thousand times smaller in terms of source activity. We strictly abide by our radiation license requirements and segregate an area around the equipment we are working on to provide a safe boundary for all personnel at your facility. Practically speaking, this usually means restricting access onto the equipment currently being scanned or traced. Our crew members are always very willing to explain these procedures with everyone potentially affected and to make sure we do not block access to critical areas.



Tracerco is licensed by multiple regulatory agencies to provide products and services to customers worldwide. Where we are not currently licensed we will work with local authorities to acquire temporary permissions. A Tracerco representative can discuss any restrictions or limitations that may impact a project.

## What are some of the advantages Tracerco can provide for my gas conditioning system?

Investigating and analysis of maldistribution problems by Tracerco has provided insightful information for diagnosing the liquid distribution in packed columns making it possible for customers to collect much more vital online process information.

A few of the benefits include:

- Identify fluid maldistribution through packed beds
- Evaluate operating condition options
- Determine the % liquid fraction providing a measure of the maximum useful capacity of packing
- Locate damaged internals and flooding
- Determine the bulk liquid levels
- Establish residence time and distribution, carry over/carry under and identify flowrate characteristics

## How will the equipment be transported to the platform or FPSO?

The most common mode of transportation for the equipment to be deployed is by boat. In some cases the transportation of the small source can be by helicopter. In a preliminary job discussion with the customer Tracerco will need to identify the mode of transportation for the equipment to be deployed.

On the boat or platform, provisions must be made for a location to store the radioactive source whilst not in use. Tracerco offshore personnel have completed offshore survival and helicopter flight training.

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

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Enabling you to make the right decision

