



### 'Grade A\*' Hazard Rank Applications



"A 'credible' release may not necessarily be detectable with any degree of certainty." – Center of Chemical Process Safety

References:<sup>1</sup> ISA-TR84.

**It is WHEN will a gas leak will occur, not IF**  
Prevention alone cannot prevent all leaks/releases

**Grade A\* Hazard Rank Applications Require**  
>10x Risk Reduction Factors (RRF) improvement<sup>1</sup>

**Effective Gas Detection Rate is at best 60%**  
For Traditional – Fixed Point Gas Detectors<sup>1</sup>

**In the Event of an Incident at your Facility**  
Are you confident that you mitigated enough risk?

### Inferred Hydrogen (H<sub>2</sub>) Detection

**Problem: Limited to Catalytic Bead Sensors**  
Issues with cross interference and is non-fail-safe

**Challenge: Need Enhanced Sensing Element**  
Area coverage, fail-safe operation, & fast response

**Opportunity: Detect Gases in ppm Levels**  
Such as Methane (CH<sub>4</sub>) or Carbon Monoxide (CO)

**Solution: Infer LEL Hydrogen (H<sub>2</sub>) Leaks**  
With Laser Based – Open Path Gas Detection

Photo Credit: Honeywell UOP (Original photo has been edited).



With Laser Based – Open Path Gas Detection, **either Methane (CH<sub>4</sub>) or Carbon Monoxide (CO)** can be detected in ppm to **infer the presence of a Hydrogen (H<sub>2</sub>) leak at an LEL level.**

Photo Credit: Honeywell UOP (Original photo has been edited).

### Pressure Swing Adsorber (PSA)



Two (2) Laser Based – Open Path Gas Detectors are **mounted in a parallel fashion above the rack of valves to detect fugitive plumes.**

**Problem: Mechanical Probability of Failure**  
The packing of valves are very likely to leak/pass

**Challenge: >90% Geographic Area Coverage**  
May not be feasible with Fixed Point Gas Detectors

**Opportunity: Remove Maintenance Burden**  
By no longer calibrating or replacing sensors

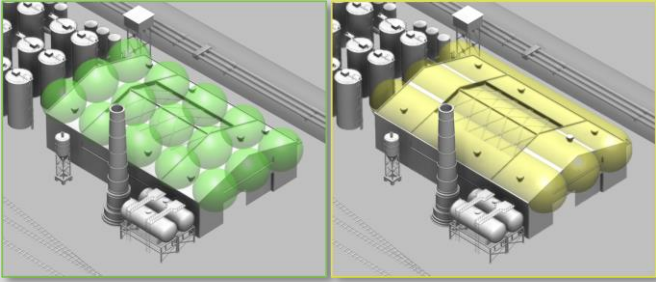
**Solution: Achieve Risk Mitigation Targets**  
With Laser Based – Open Path Gas Detection

# Geographic Area Coverage

**Traditional – Fixed Point Gas Detectors**

vs.

**Laser Based – Open Path Gas Detectors**



Laser Based – Open Path Gas Detection is the most economically viable option to minimize both the **Total Install Cost + Total Operational Cost (TIC-TOC)** in High Hazard Rank Applications.

**Definition:** The fraction of the geometric area or volume of a defined monitored process area that would be detected.

**Exceed your Area Coverage Requirements**  
With Laser Based – Open Path Gas Detection

**Increasing the Probability of Detection**  
Offers the greatest Risk Reduction Factor return<sup>1</sup>

**To Mitigate Risk in a Grade A Hazard Rank**  
You will need 90% Geographic Area Coverage<sup>1</sup>

**Laser Based – Open Path Gas Detection**  
Easiest & most economical way to Mitigate Risk

<sup>1</sup>: As stated in ISA-TR84

# Safety Availability

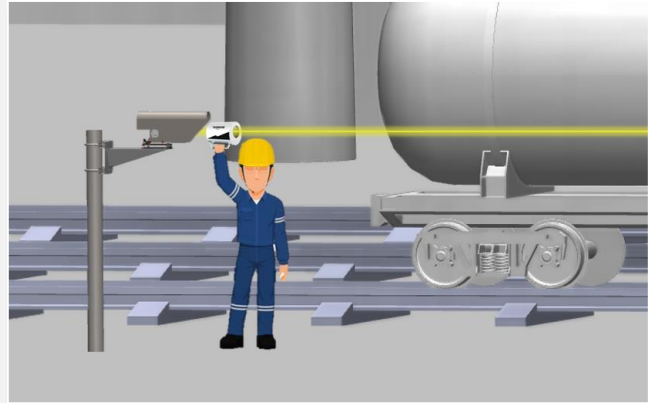
**Surpass Safety Availability Requirements**  
With Laser Based – Open Path Gas Detection

**Survive & Continue to Detect after a Leak**  
Lifespan/performance not effected by exposure

**Smart Fail-Safe Device + SIL2 Suitable**  
Only outputs gas concentrations if ‘fully functional’

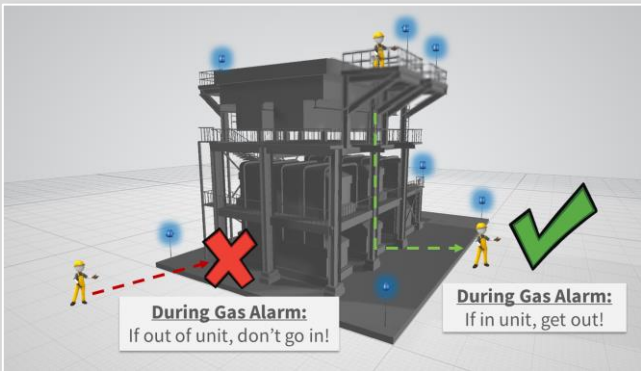
**Eliminate your Maintenance Burden**  
No Calibration and easily perform Functional Tests

**Definition:** The availability of the FGS function designed to automatically mitigate the consequences of hazards.



To perform **Function Test**, simply hold the **Response Cell** in the Laser Beam to ‘Bump’, ‘Challenge’, or ‘Verify a Response’.

# Mitigation Action Effectiveness



**During a Release:** Prevent personnel from entering the area or evacuate personnel from that area.

**Definition:** The confidence that the final element(s) actions will successfully mitigate the consequence of the hazard.

**Alarm Faster and at Lower Concentrations**  
With Laser Based – Open Path Gas Detection

**Confidently Detect Incipient Level Leaks**  
Lowest Actionable Concentrations clearly stated

**Gain an Instantaneous Response to a Leak**  
New and independent sample every second

**Importance of Timely Personnel Evacuation**  
Rapid recovery actions prevent escalating event