

# Application of Gas Leakage Detection Technology in Gas Wells

## Abstract:

To solve the problem and improve the safety for the deep gas well production, a kind of gas leakage detection technology was introduced. The gas leakage detection principle and technique confirmed its feasibility. By applying the gas leakage detection technology, could find the leakage problem in time, the unqualified tubing & casing were eliminated to be run into wells.

## Key words: gas leakage detection; thread seal; helium leakage check; coiled tubing

It is common for natural gas leakage happened in deep gas production wells. A majority of leakage occurs at the connected threads of the tubing and casing. Leakage through screw threads may cause annular abnormal pressure in some gas wells. The overly high value of which has badly influenced the normal production of those wells and down-hole accidents will easily occur when such value exceeds the allowable limits. By applying the gas leakage detection technology, could find the leakage problem in time, the unqualified tubing & casing were eliminated to be run into wells.

The gas leakage detection technology mainly applied in gas well and gas storage. The gas leakage detection system mainly includes detection tools, power equipment, accumulator, hydraulic winch, leak detectors, data acquisition and monitoring system. The system is simple, sensitive, and real-time monitoring can be realized. The precision is  $1.0 \times 10^{-7}$  mbar-L/s.

The gas leakage detection method is in the way of injecting high pressure helium into the inner sealed space of the inner wall of the connecting pipe and installing a gas collecting cover, on which there is a helium gas sensor at the outer of the pipe, then the leakage of the thread could be judged. (as shown in Figure 1)

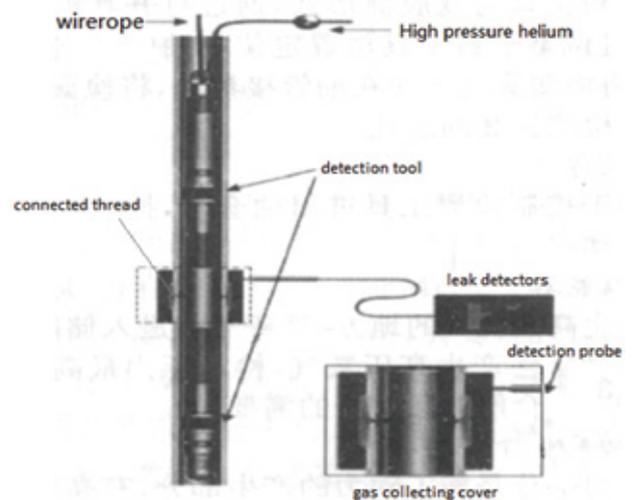


Figure 1: Gas leakage detection method

**As of the end of 2018, this technology had been applied in 1541 wells. A total of 572,138 screw threads had been detected, and 12,848 screw thread leakages had been detected. The average leakage rate of connected threads was 2.25%.**

By analyzing every screw thread leakages, there are the following reasons of these leakage:

- ① The quality of the thread was not good;
- ② Screw thread make-up was not in place;
- ③ Screw thread had not been cleaned;
- ④ The torque of connected thread was Failed;
- ⑤ The protection of the thread was not in place.

By remaking-up and replacing the pipe to standardize the pipe running operation, eliminate the substandard pipe into the well. Forming a mature gas leakage detection technology.