



## Fluid Level Monitoring

In many cases, the cleat system of undisturbed coals will be water filled and subjected to a hydrostatic head that exceeds the desorption pressure of gas occupying pores in the coal matrix. Therefore, water must be removed to lower the hydrostatic head below the gas desorption pressure to initiate coal seam gas (CSG) production.

For many coals some form of submersible pump has to be incorporated in the CSG well completion design to remove this water. The dewatering phase can last many months, or in some cases years, before the onset of gas production can occur.

Qteq's PumpTraq system provides continuous monitoring of downhole annulus pressure to track the water fluid level in CSG wells. This enables CSG operators to limit dewatering timeframes and to safeguard against rapid well pumpdown during start-up operations, which can result in significant completion skin and thus loss of CSG productivity.

PumpTraq data is also used to safeguard against the pump-off condition, which can lead to rapid failure of the submersible pump, necessitating frequent and costly CSG well workovers.

The PumpTraq system has been custom-designed for CSG environments using robust sensor technology. The optional intrinsically safe (IS) certification permits installation where other protection methods are not practicable. The sensor outputs a 4-20 mA signal that can be interfaced with the CSG operators' infield networked data communications ecosystem, or connected directly to a third-party pump controller. Very extensive best practices have also been developed to ensure reliable installation and long-term performance.

Qteq's PumpTraq systems can be further customised for either permanent deployment behind casing, or retrievable deployment on production tubing or suspended inside tubing.

## Features and Benefits

- Use of a 4-20mA analogue output signal simplifies interface with third party surface data loggers, pump control systems and other PLC systems.
- The gauge is a fully welded assembly and incorporates an integral cable head to minimise number of potential leak paths, and is available with full IECEx IS certification.
- The wellhead outlet and surface termination equipment utilises a hermetically sealed electrical feed-through to provide a pressure barrier even in the rare event of a cable breach.

## Applications

- Optimise CSG dewatering strategies
- Prevent pump-off condition
- Prevent rapid pumpdown
- Monitor pressure transients during planned and unplanned shutdowns

## Key Components

### **Analogue Pressure Gauge**

**TSS 000002**

Employs a monocrystalline silicon piezo-resistive sensor, with a Wheatstone bridge etched into the silicon substrate. This results in excellent measurement repeatability and optimises sensor sensitivity.

### **Gauge Mandrel**

**TSS 000003**

Comprises a pocket welded to a short pup joint to protect the gauge during deployment and insulate it from excessive vibration during well life.

### **Tubing Encapsulated Cable (TEC)**

**TSS 000004**

Provides a reliable, electrical pathway for transmission of measurements from the analogue pressure gauge to surface. The cable is engineered to maintain mechanical and electrical integrity for the life of the well, and comprises an insulated multi-strand conductor inside a pressure-rated control line armour. This armour isolates the insulated conductor from the well environment. The TEC is protected from damage during deployment by means of a thermoplastic encapsulation that is suited to contend with in-situ chemical and temperature conditions.

### **Cross Coupling Protectors (CCP)**

**TSS 000005**

Designed to secure the downhole electrical TEC to the casing, completion tubing or coil tubing, and protect it from damage during deployment and well completion operations across all casing and pipe connections and other external upsets.

### **Wellhead Outlet (WHO) – Type A-6K & A-3K**

**TSS 000006**

Designed to facilitate cable feed-through and termination of the downhole electrical TEC through the wellhead. The TEC is fed through the tubing hanger, sealed at both top and bottom sides and then wrapped around the neck of the hanger. The TEC is then routed through a port in the spool piece and into the bore of the wellhead flange.

### **Gauge Interface Card Type A-15**

**TSS 000007**

Intrinsically safe circuits typically require one earthing point or complete isolation. Qteq's galvanic isolator ensures compliance with hazardous area certification requirements whilst replacing Zener barriers, ground loop isolators, DC-DC converters, and eliminates the need for a bonding conductor. This is a cost effective and viable solution for connection of our gauge systems employing single conductor TEC.