



PRU Lewisburg, WV, USA

ABB Process Analytics RVP Measurements in Shale Gas Operations

Shale Gas

- Shale has long been known to contain natural gas
- Shale Gas has been found in many regions of the United States
- The recent advent of horizontal drilling and fracking (the use of pressurized liquids to break up the shale and release the gas) has allowed for the recovery of this natural gas to be economical
- The natural gas was found to contain larger amount of liquid hydrocarbons than originally expected

Shale Gas Liquids

- When the natural gas was extracted it was found to contain a high amount of liquids
- This shale gas liquids contain C5+ hydrocarbons and higher
- In many cases this liquid resembles gasoline and may be referred to as natural gasoline
- The presence of the liquids greatly increases the economic benefits of bringing the shale gas to market

Shale Gas Liquids

- The recovery of the liquids has become the primary economic driver for the shale gas operations
- The liquids must be separated from the gas and this is being done close to the well heads
- There is also the issue to getting the liquids to the hydrocarbon processing market
 - Tanker
 - Pipelines

Shale Gas Liquids Transportation

- As the volume of natural gas liquids going to market has increased more and more pipelines being used
- Tankers are used to transport much of the liquids to the pipeline terminals
- There is a requirement before the liquids can be put into the pipeline that the RVP of the liquid must be below 10 psi

RVP Measurements in Shale Gas Liquids

- The requirement for the shale gas liquids to have a RVP value of less than 12 psi is opening a new market for process RVP analyzers
 - This is a safety requirement from the pipelines
 - It is to prevent the holding tanks at the refinery from exploding
- The RVP is being measured at the pipeline terminal before going into the pipeline

ABB RVP Analyzers in Shale Gas Liquids

- The ABB RVP 4500 series is able to make the necessary RVP measurements
- The RVP 4500 series has been used in refinery operations for over 20 years to make the RVP measurements for not only gasoline but also the various heavy and light feed streams to the gasoline blenders

RVP4500 Series



RVP4500

RVP4501

RVP4503

RVP4550

RVP4540

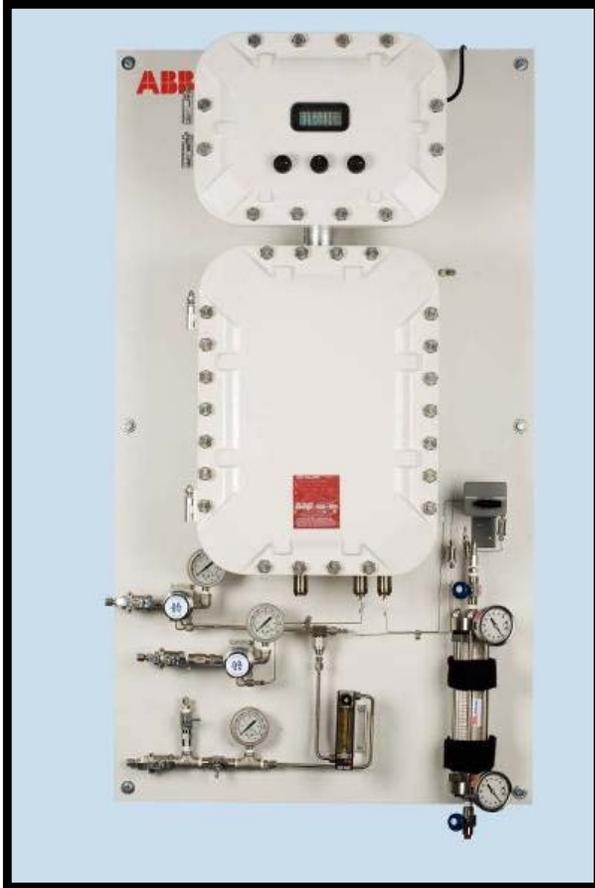
RVP4500 Series

- RVP4500 series is available in different models to cover different vapor pressure ranges

<u>RVP4500Series</u>	<u>Range</u>
RVP4500	0-20 psi
RVP4501	0-90 psi
RVP4503	0-30 psi
RVP4540	0-225 psi
RVP4550	0-20 psi w/ASU

- Due to the RVP range of the shale gas liquids the most common models for the this market are the RVP4500 or RVP4503

RVP4500



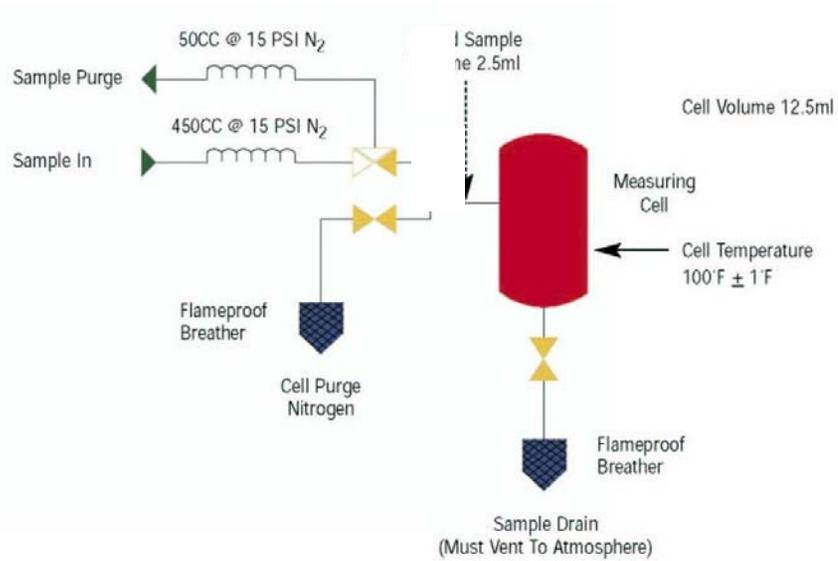
- Range 0-20 psi
- ASTM Method D5482 (off-line mode)
 - RVP4500 meets the requirements for this ASTM method
- Typical areas where installed
 - Low RVP blender feed streams
 - Debutanizer bottoms
 - Depropanizer Bottoms
 - Final Gasoline blending
 - Shale gas liquid
- Does not require field calibration
- Field proven reliable process analyzer

RVP4500 Series Controller

- New single board controller to support all the RVP4500 Series Models
- Larger Vacuum Florescent Display with improved visibility
- Built-in Ethernet, Modbus, 4-20Mamps Output Options



Model 4500 RVP



- Sample 2.5 cc
- Cell volume 12.5cc
- V/L ratio 4 : 1
- Temperature 100⁰ F



RVP4503



- Range 0-30 psi
- Uses the same analytical technique as the RVP4500
 - Has a higher range pressure transducer
- Typical areas where installed
 - Medium RVP blender feed streams
 - Final gasoline blending where final blend is above 20 psi
 - Shale Gas Liquids
- Does not require field calibration

Advantages of RVP4500 Series Analyzer for use in Shale Gas



- The ABB RVP analyzers are calibrated at the factory and do not require field calibration
 - Minimizes support requirements
- Does not require safety purge for operation in hazardous areas
 - Minimizes consumables required in the field
- Compact design
- Rugged analyzer has proven very reliable over the past 20 years
 - Designed as a process analyzer from the start and not a lab analyzer that is converted to a process analyzer
- ABB support
 - ABB offers field service support through local offices around the world

Summary

- The ABB RVP 4500 series of RVP analyzers offers a field proven analyzers for the shale gas industry
- The RVP 4500 series minimizes field support requirements by not requiring calibration in the field
- The RVP4500 series minimizes consumables by not needing a safety purge for hazardous areas
- ABB RVP analyzers are backed by an extensive network of field service support

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