# Model P-700 Reid Vapor Pressure Analyzer

## On-line Reid Vapor Pressure Analyzer for continuous measurement of hydrocarbon vapor pressures

- Measurement range of 0-35psi (0-2500 mbar)
- Superior repeatability of 0.05 psi (3.5 mbar)
- Elevated sample temperatures of up to 75°C
- Rapid analysis cycle of 5 to 6 minutes
- Optional validation sample system
- Optional stream switching
- Remote diagnostics over IP
- Standard applications include gasoline & crude oil
- ASTM D323, D-4953, D-5482, D-5191 & D-6377

The Model P-700 RVP Analyzer combines the latest, state-of-the-art technology with over 45 years of industry experience. The result is an unsurpassed, high-quality Reid Vapor Pressure measurement system that produces the process control signal required to perform today's optimized and cost-effective petroleum blending operation.

Using a simply constructed, yet rugged, measurement chamber and sample delivery method, operation cost savings have been realized without complicating the analytical system. The P-700 demonstrates the optimization of the fluidics paths by employing components and materials that allow for a rapid measurement cycle without limiting accuracy, repeatability or reliability.

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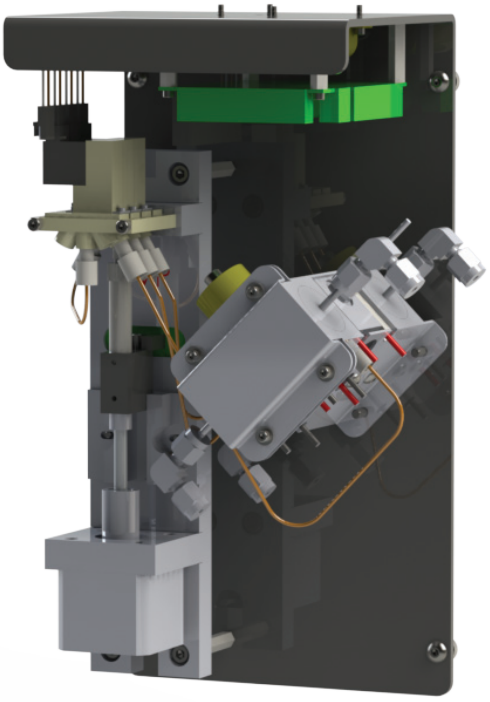
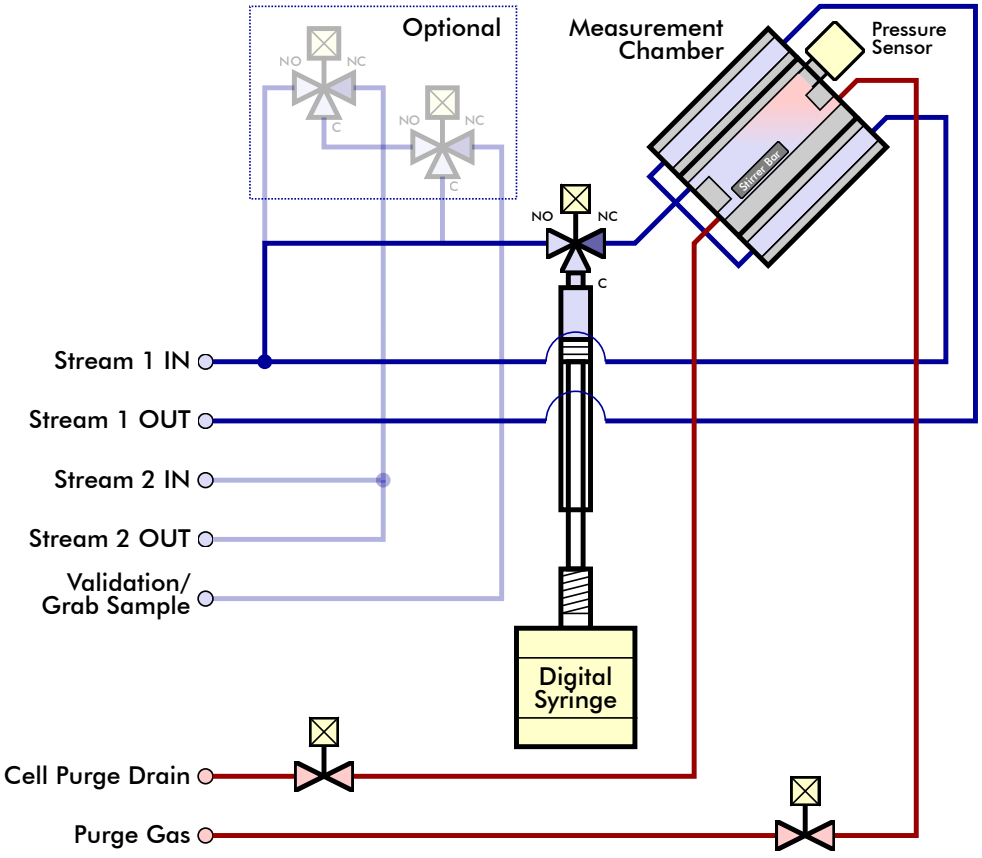
## APPLICATION

With the introduction of the Clean Air Act and its amendments in 1990 by the Environmental Protection Agency under Title II Emission Standards for Moving Sources, Part A - Motor Vehicle Emission and Fuel Standards, Section 211 Regulation of Fuels - (h) Reid Vapor Pressure Requirements, it has become unlawful to sell, offer for sale, dispense, supply, offer for supply, transport, or introduce into commerce gasoline with a Reid Vapor Pressure in excess of 9.0 pounds per square inch (psi) during the high ozone season (as defined by the Administrator).

Therefore, refineries, pipeline terminals and blending stations require a reliable and accurate analysis system of Reid Vapor Pressure to comply with this regulation. In addition, the very same analysis system will allow the operator to run the blending process in an optimized range, lowering production cost and improving product quality.





## OPERATING PRINCIPLE

The P-700's measurement cycle is based on the ASTM Methods D-323, D-4953 and D-5482 and correlates to D-5191 and D-6377. This is done by using a digitally controlled syringe sample handling system, micro-volume solenoid valves and an angled measurement chamber equipped with a high-resolution pressure sensor and magnetic stirrer.

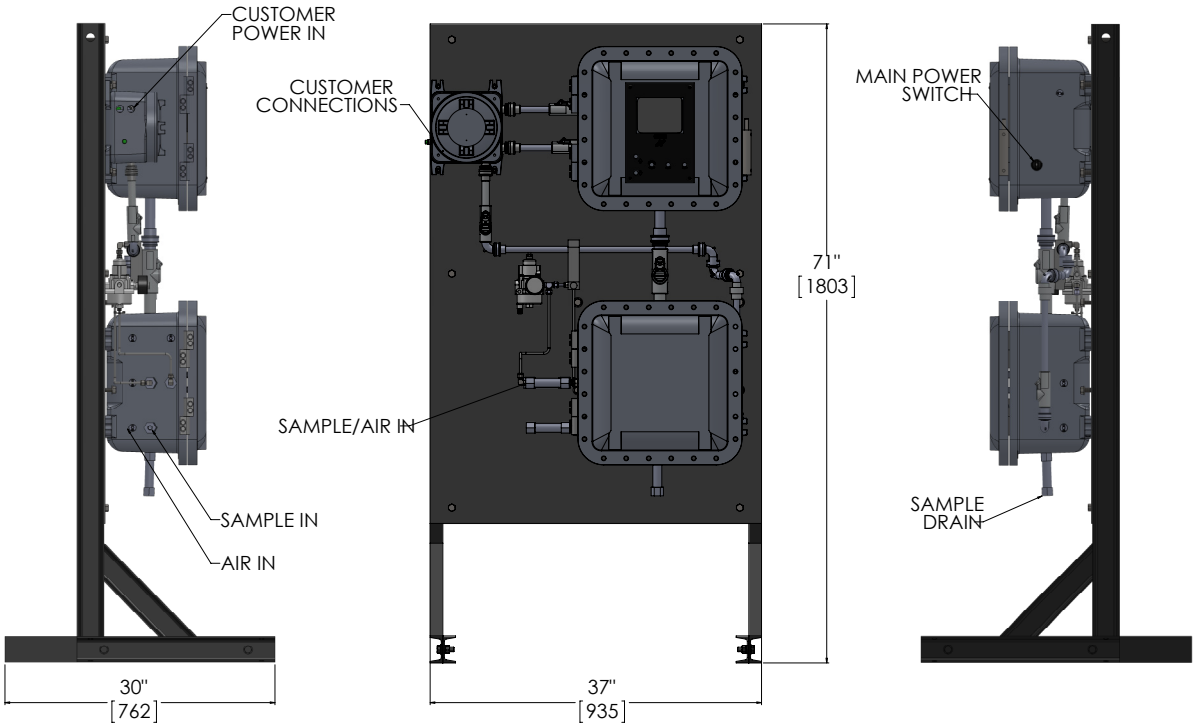
First the sample chamber is emptied by opening the sample drain and the measurement chamber vent valve. By utilizing the purge gas, any remaining fluid and vapors are removed. This is followed by a measurement chamber zeroing sequence, where the chamber and pressure sensor are normalized and the measurement baseline is established.

Second, with the digitally controlled syringe, a known gas volume is precisely drawn from the measurement chamber to be subsequently replaced by a known fluid sample volume drawn from the sample stream. This establishes the required 4:1 ratio of gas to fluid. Closing the measurement chamber sample valve starts the analysis cycle.

Prior to the measurement phase, the magnetic stirrer is activated and operated for the duration of the analysis cycle, in order to shorten the analysis time. The measurement chamber temperature is monitored and held at 100°F (38°C). The analysis is completed once the measurement equilibrium is reached and the signal has met its stabilization criteria.

By continuously tracking the pressure signal during the analysis cycle, the diagnostic function checks the fluidics system for leaks, drifts and other abnormal events. The VisioGraph advanced diagnostic routine provides end users with immediate knowledge of the condition of the analyzer.
To further enhance the precision and usefulness of the Model P-700 RVP Analyzer, an optional validation/grab sample system can be added. This will allow the end user to either introduce a reference solution or a known sample for immediate analysis. This feature provides a simple system verification or a quick analysis of a non-automated sample stream. The optional dual-stream sampling system offers an economic way of automatically monitoring two sample streams with a minimal loss of measurement response time.

## DIMENSIONS inch (mm)



## PRODUCT GUIDE

Petroleum Analyzers

- **Cloud Point**
- **Cold Properties**
- **Flash Point**
- **Freeze Point**
- **Pour Point**
- **RVP**
- **RVP /VL20**
- **Salt-in-Crude**
- **Viscosity**
- **Viscosity Index**

Other Products

- **UV-Oil in Water**
- **Environmental Cabinets**
- **Sample Conditioning Systems**
- **Sample Recovery Systems**
- **Shelter Systems**
- **Spare Parts**

Analyzer Services

- **Field Service**
- **Start-Up & Commissioning**
- **Training**
- **Technical Support**

XPROOF ATEX/CE | PURGED ATEX/CE | PURGED ATEX/CE | PURGED ULCSA/CSA | GENERAL PURPOSE

## SPECIFICATIONS: MODEL P-700 RVP ANALYZER

| ANALYSIS PERFORMANCE | |
|---|---|
| Measurement Cycle Time | 6 minutes |
| Measurement Range | 0 – 35 psi / 0 – 2.4 bar / 0 – 2400 mbar / 0 – 240 kPa / 0 – 2400 hPa (selectable) |
| Repeatability | ± 0.05 psi (± 0.0035 bar) |
| Reproducibility | ± 0.1 psi (± 0.007 bar) |
| Resolution | ± 0.01 psi (± 0.0007 bar) |
| Accuracy | Meets or exceeds ASTM Methods D-323, D-4953, D-5482, D-5191 & D-6377 |
| Pressure Accuracy | ± 0.01% of full scale |
| Temperature Accuracy | ± 0.2°F (± 0.1°C) of full scale |
| **SAMPLE REQUIREMENTS** | |
| Sample Bypass Flow Rate | Min. 0.04 L/min – Max. 0.1 L/min |
| Sample Return Pressure | Atmospheric |
| Sample Pressure | Min. 20 psi (1.4 bar) – Max. 35 psi (2.4 bar) - optional sample conditioning system available (P/N 700173) |
| Sample Temperature | Min. 35°F (2°C) – Max. 167°F (75°C) |
| Sample Particulates | less than 10 µm - optional sample conditioning system available (P/N 700173) |
| Sample Conditions | homogenous, single-phase sample without water or water moisture |
| **ENCLOSURE/INSTALLATION REQUIREMENTS** | |
| Dimensions | Width 37.0 in (940mm) – Height 71 in (1803mm) – Depth 30.0 in (762mm) |
| Weight | Purged Unit 150 lbs (68 kg)/ Exd Unit 500 lbs (228 kg) |
| Operating Temperature | Min. 40°F (5°C) – Max. 105°F (40°C) |
| Area Classification | NEC Class 1 Div 1 Group B, C + D or ATEX Zone1 II B + H2 T6 |
| Power | self-selecting 100 to 120 VAC or 200 to 240 VAC, 50/60 Hz, single phase, 2A |
| Cell Purge Gas Supply | Instrument grade air |
| **END USER CONNECTIONS** | |
| Analog Output Signal | single isolated 4-20 mA output (optional second output available), selectable for sample RVP values, analyzer system/maintenance warning or analysis measurement indication |
| Relay Output Contact | three SPDT Relays with contacts rated at 3A resistive load at 250VAC ,selectable for sample RVP value alarm, analyzer maintenance warning or analyzer fault alarm |
| Serial Input/Output Signal | TCP/IP or Serial/RTU ModBus output available |

## HOW TO ORDER

| ANALYZER SYSTEMS | |
|---|---|
| Catalog Number P-700-1400 | ORB Model P-700 RVP Analyzer, CSA-CUS Class 1 Div 1 Group B, C + D |
| Catalog Number P-700-1500 | ORB Model P-700 RVP Analyzer, ATEX Zone1 II B + H2 T6 |
| **OPTIONS** | |
| Catalog Number 777777 | ASTM 5191 Vacuum System (includes vacuum pump and collection vessel) |
| Catalog Number 700171 | Dual-Stream Sampling System, Micro Flow |
| Catalog Number 700858 | MODBUS TCP/IP Protocol |
| Catalog Number 701470 | Validation Option |
| Catalog Number 701493 | Solvent Wash Option (required on crude oil applications) |
| Catalog Number 700819 | Heated Micro Filter System (required on crude oil applications) |
| Catalog Number 700228 | Sample Recovery System (for pumping flash sample from atmospheric drain back to process pressures) |
| Catalog Number 700538 | Sample Conditioning System |
| **ACCESSORIES** | |
| Catalog Number 700175 | 1-Year Spare Parts Kit |
| Catalog Number 700176 | 2-Year Spare Parts Kit |

Lit. No. Product Catalog-P700-EN-US /APR14

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