

MINIMUM MISCIBILITY PRESSURE APPARATUS

Understanding the minimum pressure which gas is miscible in the reservoir is key to well gas injection. The gas injection pressure has a significant cost implication to the operation of the well. Included are Quizix precision syringe pumps as well as an innovative gasometer with infinite volume. Chandler's MMPA provides extremely accurate data along with significant savings and value over conventional instrumentation.



- High degree of automation allows for unattended operation
- Precision pumps offer exceptional pressure and volume control
- Visual record of transition phase capability
- Innovative gasometer with infinite volume

FOAM RHEOMETERS

Foam Rheometers measure the rheological properties of foamed fluids under high pressure and temperature conditions. They are designed to simulate the foam fracturing and acidizing process under well bore pressure and temperature conditions. The automated system allows the operator to control foam quality, shear rate, shear stress, test time and operating temperature. High pressure viewing cell and imaging software can provide an analysis of the foam under test conditions.



- Max. working pressure: 0 to 5800 psi/400 bar
- Max. temperature: Ambient to 350°F/177°C, other temperatures considered
- System performance:
 - Shear rate range: 50-1300 1/sec
 - Shear stress range: 0-1300 dyne/cm²

For over 70 years, Chandler Engineering has produced the highest quality measurement instruments for the Oil & Gas Industry. Today, Chandler Engineering, the Industry's largest instrument supplier, continues its efforts to help their customers improve the efficiency and productivity of their drilling and production operations.



The Oil & Gas Industry is truly a global endeavor with operations on every populated continent. As a global industry needs global support, AMETEK strives to continuously grow and develop its sales and support network. In addition to a global network of factory trained personnel, AMETEK maintains factory-direct customer support capabilities at its manufacturing sites and a growing number of regional offices.

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Our global support network of AMETEK offices and factory-trained distributors and representatives continues to grow. Contact us at chandler.sales@ametek.com today.

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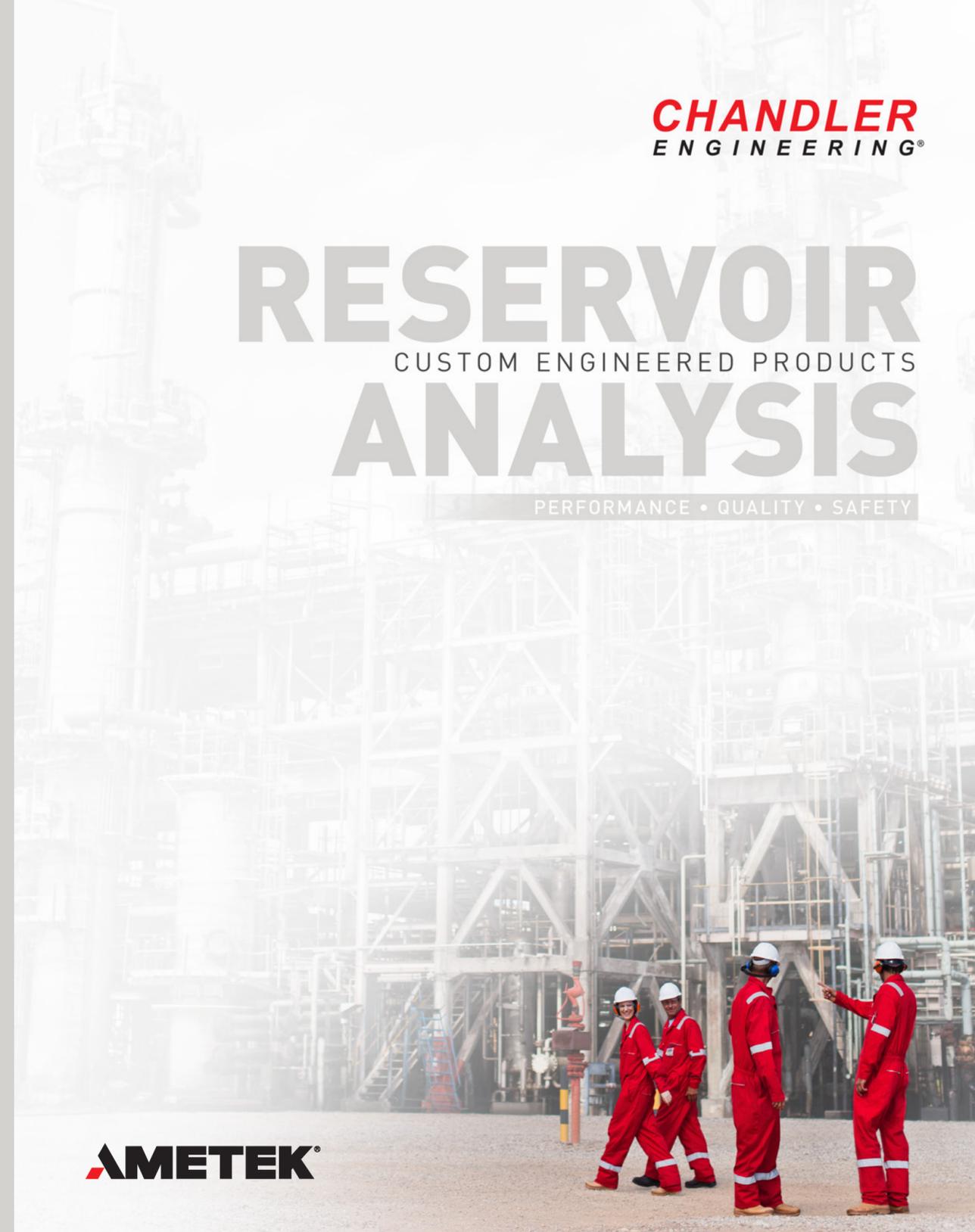
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RESERVOIR ANALYSIS

CUSTOM ENGINEERED PRODUCTS

PERFORMANCE • QUALITY • SAFETY

AMETEK®



QUIZIX PUMPS FOR CORE FLOW

Quizix Precision Pumps are the industry standard for core flow studies by operators, service companies and research laboratories. These positive displacement pumps provide pulse-free continuous flow at extremely accurate flow rates, pressures or constant volume operating modes.

A wide range of flow rates, pressure configurations and available options allow Quizix pumps to meet virtually any experimental requirement from bench top to pilot scale. Quizix pumps are designed to handle slurries, pastes, liquids or gas flows, providing unique capabilities not found in other positive displacement pumps.

QX SERIES

QX Series pumps deliver unparalleled accuracy and repeatability – with the superior pulseless metering that is critical for so many of today's production and research environments.

Features:

- Small footprint with dual cylinders in a compact design
- Pulse-free flow at all rates and pressures
- Deliver or receive in flow or pressure modes
- Control pump based on time, pressure, rate, fluid volume or events



QX SERIES

Q5000 SERIES

The Q5000 Series pumps are the industry standard for accurate, pulseless flow and precision pressure control for all types of core applications. These positive displacement metering pumps are ideal for handling aqueous solutions, brines, hydrocarbons, refined oils and gases such as CO₂.

Features:

- Pressures up to 20,000 psi
- Flow rates up to 60 ml/min
- High temperature option up to 545°F/285°C
- Configurable cylinder combinations provide flexibility to meet application specifications



Q5000 SERIES

Q6000 SERIES

The Q6000 Series pump systems are large volume, high flow pumps that are ideal for handling true gases, viscous slurries, or almost any fluid requiring higher flow rates.

Features:

- Pressures to 30,000 psi
- Flow rates to 400 ml/min
- Temperature capability from ambient to 545°F (285°C)
- Multiple cylinder configurations provide flexibility to meet your application requirements



Q6000 SERIES

PUMPWORKS SOFTWARE

Operating from the proprietary PumpWorks software, there are 14 standard modes of operation and a sequencer function for automated response to internal or external system functions. PumpWorks easily interfaces to other Data Acquisition and Control programs via an embedded Open Platform Communications (OPC) server. Also included are ramping procedures by time, pressure, flow or volume.

PHASE BEHAVIOR

PVT or Phase Behavior Systems are used to measure properties and phase Behavior of hydrocarbon reservoir fluids. PVT data provides information needed to properly manage reservoir production. Initial measurements of fluid compressibility and shrinkage factors are used to determine oil and gas in place and provide inputs for recovery estimates. Bi-directional constant pressure mode and control of flow or pressure via external devices.

The types of studies commonly conducted with these systems include:

- Measurement of saturation pressure (Pb; Pd)
- PVT analysis of bottom hole oil samples
- PVT analysis of recombined oil samples
- Determination of oil viscosity and density
- PVT analysis of recombined gas condensate samples

MODEL 3000 PVT PHASE BEHAVIOR SYSTEM

These systems are the latest generation of the original commercial mercury-free system widely used in domestic and international laboratories. The computer-based data acquisition and control software simplifies set-up, testing and data acquisition. A number of modular options are available to extend system capability.



MODEL 3000 PVT

MODEL 2331D DIGITAL GASOMETER

System accurately measures atmospheric gas in the PVT laboratory and allows precise measurement with a minimum of technique. These digital instruments feature two volume chambers, 1,000 cm³ and 2,000 cm³ for a total of 3,000 cm³, which allows flexible operation. The measured gas remains in its separated condition such that further gas analysis is possible.



MODEL 2331D

MODEL 2353 EQUILIBRIUM FLASH SEPARATOR

Separation tests simulate the gas and liquid separation of a reservoir fluid at the surface conditions. Results generated include gas/oil ratio, formation volume factor, and evolved gas properties. These data are often used in an EOS simulator to optimize separator conditions for maximization of oil production. The Flash Separator can be supplied as a complete system or as the separator module only.



MODEL 2353

ANCILLARY EQUIPMENT

AMETEK Chandler Engineering manufactures and supplies a range of additional items required for the efficient operation of a full PVT laboratory, whether a research or a service laboratory, including items such as Recombination Cells, Sample Conditioning Systems, Viscometers, Sample Cylinders, Coil Densitometer etc.

CUSTOM CORE FLOOD SYSTEMS

CUSTOM CORE FLOOD AND EOR

Based on our popular FRT platform, these systems are easily customized to meet your application requirements. Simplified flow paths, low dead volumes, multi-phase or sequential flows, and many available options provide an easy to use and easy to maintain functionality.

CORE ANALYSIS SYSTEMS

Single and multi-phase core flood systems for permeability, relative permeability and EOR applications. Systems are customized based on users application criteria and use Quizix precision pumps to displace fluids in open loop or closed loop recirculated flows. Many options are available for core holders, accumulators, dP transducers, and types of oven enclosures.

- Component heating to 350°F/177°C
- Core holder options: Hassler, Bi-axial, with or without pressure taps
- CO₂/liquid separation and measurement
- Ergonomic design for quick access to all components
- Unique valve manifold minimizes dead volume



Core Flood Systems designed to meet specific applications as required by laboratories individual needs.

MULTI-PHASE CORE FLOOD SYSTEMS

- Open or closed loop flow systems for steady state and unsteady state core flood
- 1-Phase, 2-Phase and 3-Phase flow options
- Max. pressure 10,000 psi
- Max. temperature 350°F/177°C
- Unique oven design provides ergonomic access to internal components
- Core holder options: hassler, bi-axial, tri-axial, with or without pressure taps



3-phase closed loop recirculation core flow system

MODEL 6100 FORMATION RESPONSE TESTER

An automated system designed to study the effect of fluid treatments on the permeability of core samples and formation damage. The system features forward, reverse and across-the-face core flow paths for up to five separate fluids in any sequence, through any flow path. Available in either stainless steel or Hastelloy wetted components to allow testing with virtually any corrosive liquids. Temperatures up to 177°C/200°C and pressures up to 6,000 psi/10,000 psi are available. Test control and data acquisition are fully automated allowing an operator to program a flow regime at specified rates, temperatures and pressures. Permeability may be compared throughout a wide range of conditions.



MODEL 6100