

Designed and manufactured by a leader in Custody Transfer Measurement:

## Brodie Provers

The most reliable means of determining and verifying the accuracy of a Custody Transfer liquid sales meter is to compare the measured volume of liquid through the meter against the known volume of a bi-directional meter prover system.

Brodie's Bi-Directional Pipe Provers provide automated, on-site calibration for all flow metering installations, and remain the most commonly used device to verify meter readings, establish meter factors and reduce end user risk typically associated with measurement errors.

Every drop counts.



## Decades of Experience

Brodie International has decades of experience in handling provers. The Brodie prover engineers are experienced in designing, engineering, manufacturing and testing all types of provers.



Prover system during final assembly



Commissioning of prover system on site

## Prover Technology

### Function

In order to verify Custody Transfer liquid sales meters, displacement provers play a key role in the petroleum industry.

Meter provers can be stationary or mobile, dependent on customer requirements and if the prover will be dedicated to one meter run or multiple runs.

### Bi-Directional or Piston type Pipe Provers

Brodie bi-directional pipe provers offer the advantage of continuous flow through the meter being calibrated without interrupting the process movement.

### Design

The design is individually tailored to the available space on site. The liquid product and the required flow rates of the meters are also important parameters.

### Meter Calibration Factor

Brodie Pipe Provers record the output coming from the flow meter during the displacement of the metered flow through the prover's known volume. The comparison of the meter output to the known volume of the prover results in the definition of the meter calibration factor. The meter factor corrects the meter's inaccuracy.

Applying the meter factor to the meter results in a more accurate measurement particularly in applications under Custody transfer requirements and fiscal measurement.

## Applications

- Hydrocarbon and chemical processing
- Pipeline metering terminals
- Ship, tanker and barge loading facilities
- Refineries
- Petrochemical plants

## Specifications

- 4 to 36 inch measuring sections
- Flow rates from 100 BPH to 27,000 BPH
- Suitable for temperatures from -50°F to 190°F

These provers are ball type bi-directional, as well as piston-type for low temperature.

Bi-directional provers in particular offer long-term reliability with minimum maintenance.

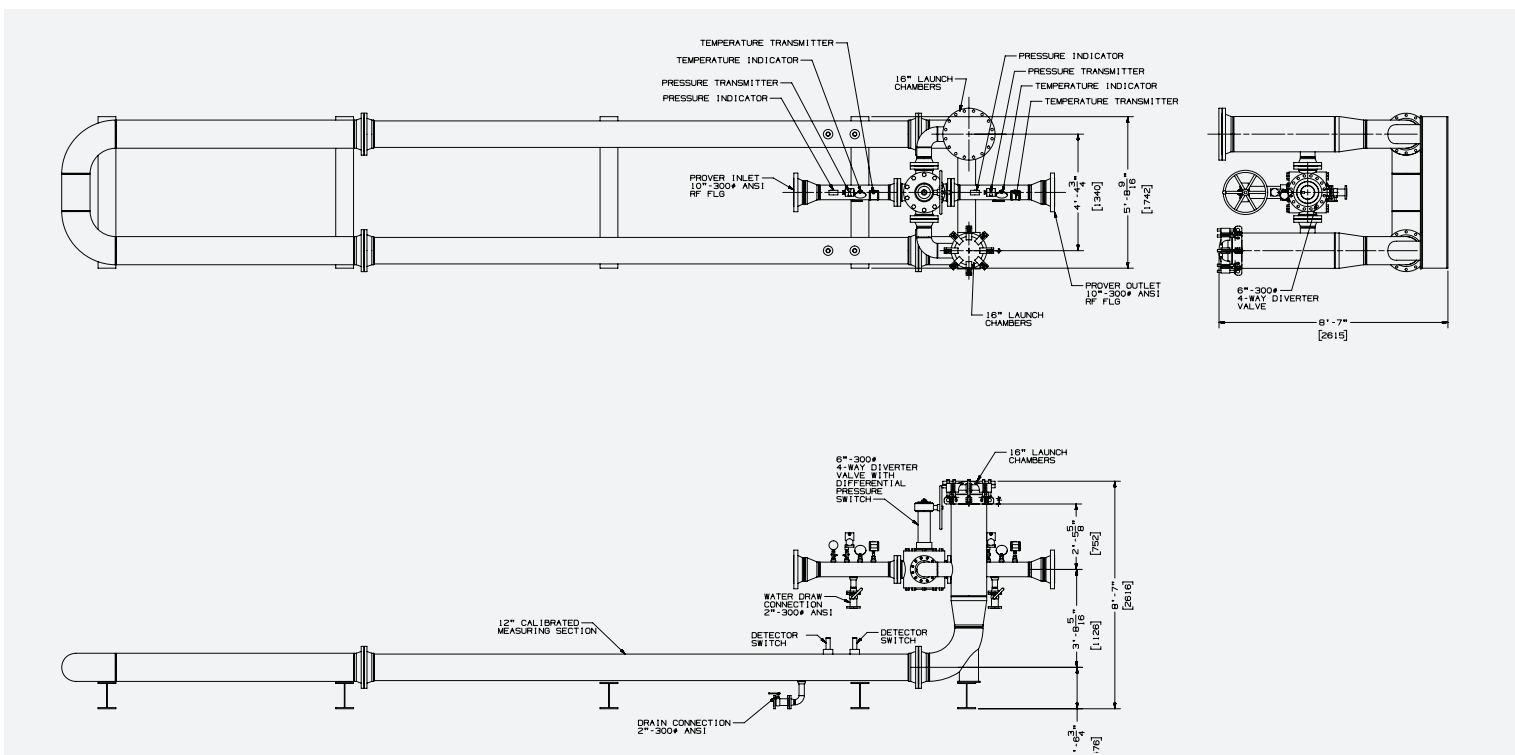
## Certificates and API Standards

All Brodie Provers have their volume certificates by a third party. The calibration certificates are furnished to the client.

The provers are in accordance with, and will meet the design and construction standards set forth by the American Petroleum Institute (API Manual of Petroleum Measurement Standards, Chapter 4.2 Proving Systems) as well as ASME B31.3, "Chemical Plant Refinery Piping" and/or ASME B31.4, "Liquid Transportation Systems for Hydrocarbons".

The repeatability is within 0.02 percent per API Chapter 4.2 and Chapter 12.2.4.

## Design





# Material & Equipment

## Materials

- Pipe - ASTM A-106/53-Gr B Seamless (to 24" size)  
API 5L-Gr B above 24" size
- Flanges and threaded fittings - ASTM A-105
- Weld fittings - ASTM A-234 WPB
- Studs - ASTM A-193-B7
- Nuts - ASTM A-194-2H
- Gaskets - Spiralwound, 304SS
- O-Rings - FKM

## Equipment

- Four way diverter valve with FKM seals and differential pressure gauge
  - Valve actuator - Electric Class I Group D Div II
  - Detector switches
  - Sphere - Inflatable polyurethane, nitrile, or neoprene with accessories (pump and sizing ring)
  - Quick opening closure, hinged or davit type (one side)
  - Thermometers - and SS thermowells
  - Pressure gauges with isolation valves
  - Pressure relief valve
  - Vent valves
  - Drain valves
- Semi-skid beam supports

## Painting

Painting of the external includes sandblast to white metal and one coat zinc chromate primer internal painting involves sandblast to white metal and 10 to 12 mils air dried epoxy or baked on phenolic coating.

## Hydrotesting [Water Draw]

Brodie provides hydrotesting of all provers to 1.5 times of the design pressure, accompanied by a hydrotest chart.

The inspection of flanges match bored, dowel pinned and O-ring groove for metal to metal seat.

Provers are calibrated using the water draw method.



Brodie International

P.O. Box 450 (30459-0450)  
19267 Highway 301 North  
Statesboro, GA 30461,  
USA

Email: [sales@brodieintl.com](mailto:sales@brodieintl.com)  
Phone: +1 (912)489-0200  
Fax: +1 (912) 489-0294