

# ARCCO - Anubis

... Serving All Your Prover Needs ...

## The ARCCO Pycnometer

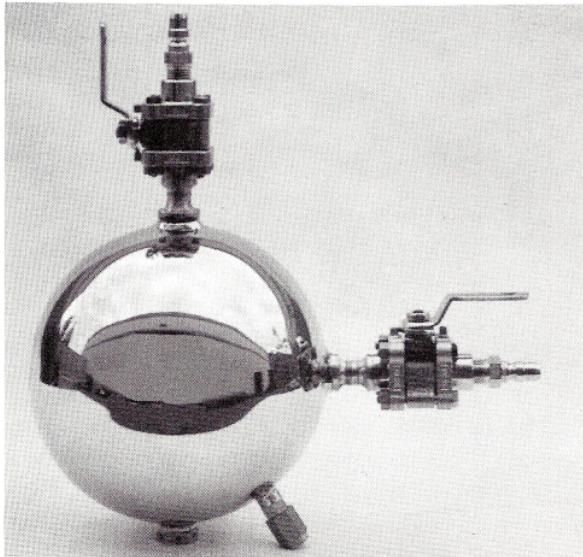


Fig. 1 ARCCO-Anubis thermos Pycnometer

• Applications engineers ready to work out **custom solutions** to your pycnometer problems:

- special valving requirements
- internal flow options
- low pressure drop configurations
- fittings and installation of accessories
- manifolding

## The History

ARCCO-Anubis has consistently been a pioneer in gravitometer and density meter technologies. The ARCCO gravitometer has been a reliable workhorse for customers world-wide since it was introduced in the late 1930's.

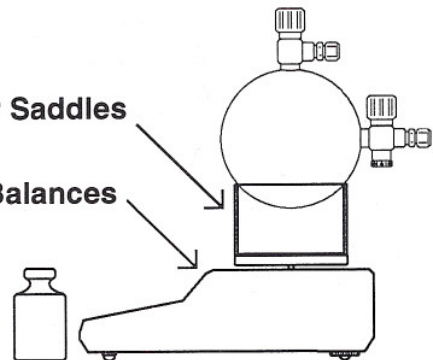
The first commercially available high pressure Pycnometers for proving gravitometers were manufactured by ARCCO in 1971.

Twenty-five years later, ARCCO still leads the industry in providing full prover service that includes everything you normally need for proving density meters per the latest edition of API Chapter 14.6.

## Pycnometer Saddles

## Electronic Balances

## Class "1" Calibration Weights



## Everything You Need for Proving Density Meters

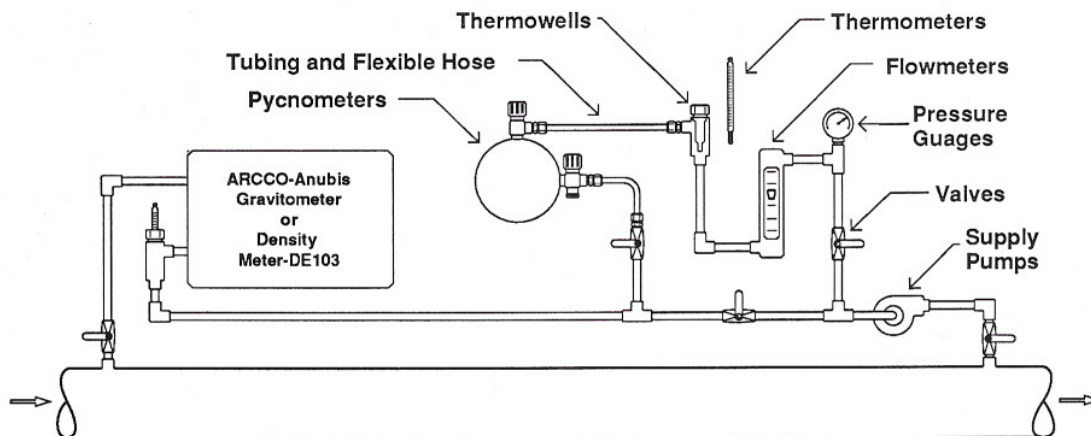
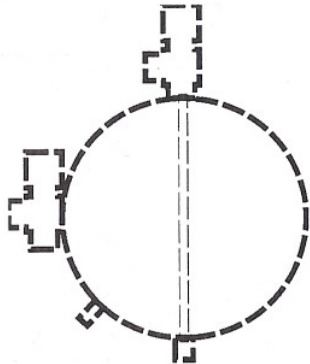


Fig. 2 Most Popular ARCCO Density Meter Proving System

## Standard Pycnometer



### Standard Features

- **Twenty five years experience** manufacturing high pressure precision pycnometers.
- Patented flow-through design that **eliminates particles and gas**. Always know you are **weighing liquid only**.
- **All welded construction**; valves are welded to prevent leaks and enhance volume accuracy.
- **Low Tare Weight**: easily handled by most electronic balances.
- **High gloss polished finish** to reduce false weighings due to dirt or grease adhering to the surface.
- Includes all **metal welded case**, two piece construction. Lined with high density foam for protection.
- **Matching Safety Rupture Disc**; same weight and lot as original disc.
- **Radiographically and hydrostatically tested** per a.n.s.i. / B31.3 construction standards.

## Pycnometer Description

Nominal Volume	1000cc
Certification Accuracy	+/- .005 cc
Typical Temp. Coefficient	.03 cc / °F
Typical Pressure Coefficient	.0013 cc / psia
Materials of Construction	316 SS Inconel 718
Safety Rupture Disc	1900 <sup>±</sup> 100 psig 2850 <sup>±</sup> 150 psig
Standard fittings	1/4" or 3/8" FNPT
Nominal Tare Weight	1300 grams
thermos Tare Weight	1900 grams

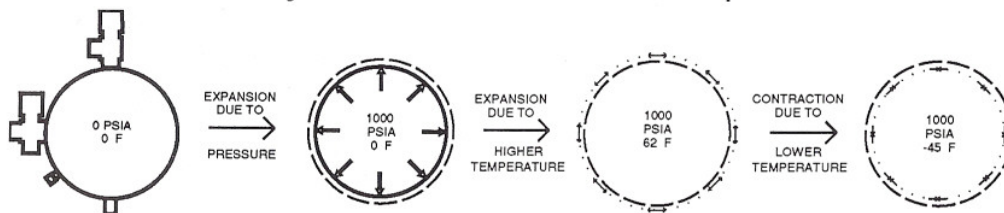
### thermos Features

- **Vacuum insulated "pycnometer volume"** for low temperature products and "boiling" liquids.
- **Eliminates "sweating"** of ambient air vapor on pycnometer walls.
- Retains a **low Tare Weight**.

### Factory Testing

- Leak tested without safety Rupture Disc at **3500 psig for 5 hours**.
- **Final pressure test** with Safety Rupture Disc at rated pressure less the tolerance for 1 hour.
- **Volume Certification** in a computerized laboratory according to the latest revision of the **Water Weight Method described in API Chapter 14.6**.
- **Recertification Program** will notify you when 10 months have passed since your last certification.

## The Pycnometer Certification Equation



$$\text{Pyc Volume} = [\text{Pyc Base Volume} + (\text{Psia} * \text{Press. Coeff.})] * [1 + (°F * \text{Temp. Coeff.})]$$

## Model PSQ 4100 Balance



### Balance Features

- **Capacity** of 4100 grams; more than enough for the heaviest pycnometer and 1500 grams of liquid.
- **Precision** of  $\pm 0.01$  grams; comfortably exceeding the API Chapter 14.6 recommended precision of  $\pm 0.05$  grams.
- **Data Communications** through bi-directional RS-232C at keyboard selectable Baud Rates from 300-9600; connects directly to standard processing equipment.
- **Custom Saddle** mounted directly on the pan designed to hold the pycnometer in the same position for every weighing; essential for maximum accuracy.
- **Calibration** is a simple push-button operation; it's amazingly easy to keep this scale operating at maximum accuracy.
- **Digital Display** on a 6-digit long life LCD.
- **Quartz Sensor** with high stability and low hysteresis that is not effected by large masses of ferrous metal.
- **Battery Powered** option for field use is available.

## Model PSQ 4100 Electronic Balance

ARCCO offers a high accuracy analytical balance for density proving. The Model PSQ 4100 is manufactured by a long established balance maker and customized for pycnometer weighing at the ARCCO factory.

An important feature of the Model PSQ 4100 is the quartz sensor at the heart of the electronic load cell. A load cell with a **quartz sensor** is not adversely effected by the presence of large masses of the metals such as the pycnometer.

### Specifications

- **Readability** of 0.01 grams.
- **Response Time** is typically less than 2 seconds.
- **Operating Temperatures** of 40°F to 110°F.
- **Power Requirements** are 5 watts of 120 VAC, 50 or 60 Hz.
- **Dimensions** are 1 x 7.5 x 11 inches.
- **Weight** is 10 pounds.

### Class "1" Calibration Weights

ARCCO offers NIST CERTIFIED, class "1" calibration weights in a wide range of sizes up to 4 kilograms. These weights are NBS traceable and typical 4000 gram weight has a tolerance of 0.012 grams.

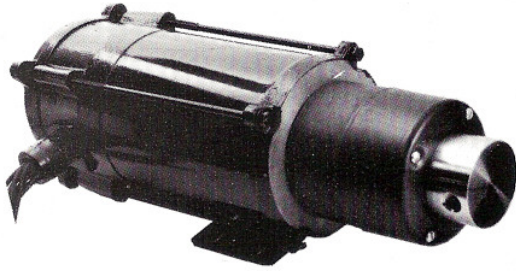
For density proving the stability of the weight is the most important feature. For this reason, class "1" weights are cylindrically shaped and made of stainless steel with a satin finish.

Individual weights are **packed in a sturdy case** for protection and include laboratory gloves to minimize contamination.

These are "**apparent weight**" standards. The nominal mass value (i.e. 4000 grams) assumes the weight has a density of 8.0 gms/cc and is weighted at sea level in dry air at 70°F. Since this is never the case (density of SS is 7.8 gms/cc), API Chapter 14.6 requires the application of a CBW (**Correction for the Buoyancy of the Weights**).

A certificate is provided that documents the traceability of the weight to a specific NIST certificate number and serial number.

## High Pressure Supply Pumps



For those applications where the available differential pressure is too low to provide adequate flow through the Pycnometer system, the ARCCO supply pumps are the perfect solution. ARCCO offers a full line of pumps with the same basic specifications except for the differing flow rates.

Both models feature:

- Type **316 stainless steel** pump bodies;
- **Viton or EP "O"** ring seals;
- Maximum head pressure of 2500 psig;
- Temperature range -50°F to 250°F.

Both pumps use the same drive motor:

- **UL approval;**
- Explosion-proof rating **Class 1, Groups C & D;**
- One-sixth horsepower-3200 rpm;
- 115/230 VAC, 50/60 Hz;
- Ball bearings, non-ventilated;
- Permanent split capacitor.

Model **MP220CF** delivers up to 90 GPH.

Model **MP221CF** delivers up to 150 GPH.

## Flowmeters, Hoses and Fittings

- High Pressure, protected **rotameter flowmeter;** standard models available.
- Stainless steel fittings; pipe and tubing sizes
- All metal welded **stainless steel hoses:**
  - protective braid over convoluted tubing
  - 1/4" male NPT end fittings
  - 12" or greater in length; according to customer specifications.

## Industrial Glass Thermometers

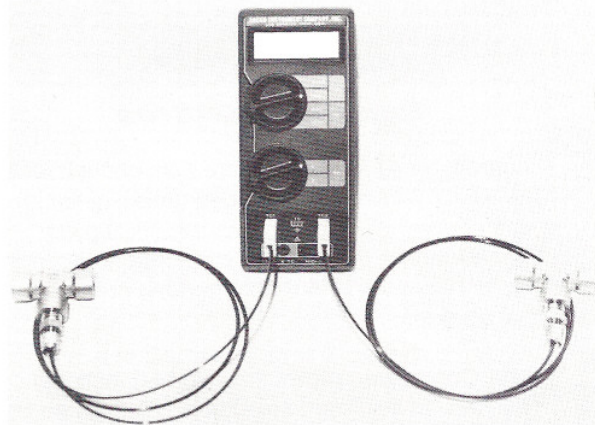
- Mercury-filled for industrial testing: meets NBS specifications.
- **Yellow-back** provides sharp contrast for deeply etched letters and graduations.
- All thermometers individually engraved for greater accuracy.
- Each thermometer is individually packed in protective plastic tube.

## Thermowells

ARCCO offers a full line of standard high pressure, welded thermowells:

- For holding industrial glass thermometers, thermocouples, or RTD elements.
- Thread sizes of 3/4" or 1".
- Insertion lengths from 2.5" to 24".
- Brass, carbon steel, 304 and 316 stainless steel.
- Wells of special materials and sizes can be provided on special order.

## Digital Thermometer



The Dual Lead Digital Thermometer is an important part of proving system. Typically one of the thermocouples is located directly downstream of your sample probe and the other located directly downstream of your Pycnometer outlet valve.

Included in this unique temperature system are:

- Tee fittings for quick connection to your piping;
- Insertion fittings for the thermocouple probes;
- Pair of stainless steel braided lead thermocouples with male plugs for easy connection;
- Battery powered hand held Digital Thermometer.

**ARCCO** INSTRUMENT COMPANY, INC.  
MANUFACTURERS OF PRECISION INSTRUMENTS  
1745 Production Circle • Riverside, CA 92509 • U.S.A. •

(951) 788-2823 Fax (951) 788-2409