PRENTEX Pressure Aging Vessel Specifications

THE ORIGINAL PRESSURE AGING VESSEL - Designed, Manufactured, Distributed since 1993

Meets ALL requirements: AASHTO, ASTM D-6521 and EN-14769 Standard Practices for PAV
Compact Laboratory Counter-Top Unit Operational from standard 30" laboratory counter with vertical loading rack designed for 10-pan specimen capacity. (The 9300 *does NOT require special low bench for easy operator access or excessive weight support*)

Pressure Vessel Design:

All-Stainless Steel vertical vessel with hinged lid; Designed, Manufactured, Tested & Stamped in Accordance with *ASME Boiler and Pressure Vessel Code, Section VIII, Division 1* for maximum of 350 psig @ 300°F [2.45MPa @ 148°C] (Operating pressure will be lower than maximum design.)

System Controller:

[1] Data Logging: All Data available for downloading upon completion of aging run: Temperature (wall & air), Pressure, Elapsed time, Temp Error Time, Pressure Error Time, & Power consumption

[2] Alarms: Timing [Audible and visual]:

[a] Temperature out of tolerance by more than ±0.5°C in excess of 60 minutes; or failure to achieve reheating and pressurization within two (2) hours after loading specimens

[b] Pressure out of tolerance by more than ±0.2MPa for five (5) minutes; or failure to achieve initial pressure of at least 2.08MPa

System [Visual or Mechanical only]:

[a] Pressure greater than design limit of 2.45MPa or lower than set-point by more than 0.02MPa.

[b] Over-temperature condition [*in excess of 150°C*] will cut power cut off to heaters.

PAV Operation: Digital Indication & Control

Accuracy ±0.03MPa of set-point

PAV Operating Pressure: 0.00MPa to 2.10MPa [305 psi]

Pressure Measurement via Solid-state pressure transducer with:

Resolution: 0.5 psig [0.003MPa] &

Accuracy: 0.5% (±0.01Mpa)

Range: 0-500 psig [0-3.45MPa]

PAV Operating Temperature Range:

Fully-Automatic at 90.0°C, 100.0°C, 110.0°C (& 85.0°C under EN14769 Standard)

Semi-Automatic from 60.0°C to 120.0°C (with Research & Development Software)

Non-Automatic (Manual Mode) from Ambient to 129DegC

Temperature Measurement: Precision Platinum RTD, 0.1°C resolution: Accuracy ±0.1°C

Temperature Control PID digital indication and control: Accuracy Set-point ±0.3°C

Temperature Uniformity ±0.5°C of Aging Temperature Set-point when pressurized

Over temperature Protection Oven 150°C Limit Shut-Down Switch

Timing System Clock-controlled microprocessor, 0.1% accuracy on all functions

Timing Displays: [1] Elapsed Aging Time [from pressurization];

[2] Cumulative time out of temperature tolerance [±0.5°C];

[3] Cumulative time out of pressure tolerance [±0.5°C]

Air Regulation and Inlet System **furnished with adaptors for standard industrial compressed air cylinders, 6' foot stainless over-braided connecting hose with female quick-disconnect, and mating male quick-disconnect on rear of PAV System Cabinet.**

Pressure Safety Release: Spring-Loaded Relief Valve calibrated to release pressure at 350 psig

PAV Exhaust :Air muffler installed; Adaptor for venting supplied as accessory.

Calibration: Furnished with N.I.S.T. traceable calibration of temperature and pressure sensors, calibrated at aging temperature and pressure.

Air Requirements:
Commercially furnished compressed air is the standard for use with the PAV.
The required delivery pressure for this air is 2.2 - 2.4MPa (22 - 24 bar).

Power Requirements / Consumption: 120V 60Hz, 10A **OR** 208-240v AC, 50-60Hz, 5A

Cabinet: Requires only 31" overhead clearance for cabinet lid opening.
Stainless Steel construction:
Dimensions: 25½ "x 17" X 17" high;
Weight: 180 pounds (Approximately 230 shipping weight)

Operator's Manual:
Includes operation, maintenance, periodic calibration procedures, and basic troubleshooting.

Warranty: One (1) year parts and labor

Technical Support:
[1] Available via phone, fax or e-mail at no charge
[2] Live phone support available Monday - Friday 8:30-4:30 [Central Time Zone]

International Electrical Requirements:

➢ Voltage, Frequency and Current Consumption:

The Model 9300E/SC PAV is manufactured for operating on 230 - 250 volts A.C., 50 / 60 Hz as the standard wall plug-in power for International usage. The Model 9300E/SC PAV System requires a maximum of 5 amperes of electrical current and can be connected to a standard wall outlet.

(Note: Domestic PAV 9300SC or PAV9300A operate on 120V, 60 Hz, 10A)

➢ Power Quality

High quality power without significant electrical noise or transient voltages is required. As a minimum, all 9300 PAV Systems should be operated with a high-grade computer-type electrical power surge protector or UPS (uninterruptible power source).

➢ Power Reliability

The 9300SC System Controller, which is part of the 9300E/SC PAV System is a miniature computer in its own right. As such, if the power is interrupted for more than about one second during the 20-hour aging process, the System Controller will shut down. When power is restored, it will display the message "Press Start to Begin" and the aging run will not automatically resume. If there are samples already undergoing the aging process, they are ruined. Therefore, Prentex strongly urges all users of the Model 9300 Series PAV Systems to operate their Prentex PAV System from a computer-type Un-interruptible Power Supply (UPS) with a minimum volt-amp (volts x amperes) rating of 1500 volt-amps. Several users in the U.S. have reported operation of their Prentex PAV System for as long as 2 to 3 hours on a UPS rated at 1,500 volt-amps during power interruptions. UPS units capable of providing operation for any considerably longer period are also available in most areas.

High-volume computer retail stores generally provide the best pricing on such units. If the purchaser is not familiar with this type product, consult with a few local computer experts to determine which are the most reliable manufacturers of UPS products sold in their country or region, and restrict purchases to only the highest quality brand names.

Compressed Air Requirements:

➢ Specifications:

The accepted standard practices of operation of pressurized aging vessels (PAVs) for the purpose of artificially aging paving asphalt /bitumen samples call for "clean, dry, filtered air". The required delivery pressure for this air is 2.2 - 2.4 MPa (22 - 24 bar). Commercially furnished compressed air is generally the standard for use with the PAV. The delivery unit is commonly referred to as a "cylinder" or "bottle" rather than "tank". The descriptive term used refers to the shape of the container – generally approximately 1.5 meters tall and 0.25 - 0.33 meters in diameter. The pressure in these cylinders or bottles is generally approximately 15 - 24 MPa (150 - 240 bar). Although no specification for "dry" has yet been introduced into the U.S.-based standard practices for the PAV, a commonly accepted specification is "air having a dew-condensing point at or below -40 degrees Celsius". Commercially available compressed air in the U.S. is often referred to as "industrial grade", "breathable air" and "high-purity air". Depending on the supplier's own quality standards, any of these grades may be acceptable and economical for PAV use. The extra expense sometimes charged with "high-purity air" may render it too costly for PAV use. "Breathable air", however, is generally produced in large quantities and is relatively economical. "Industrial grade air" is poorly defined, and from supplier to supplier its quality may range from not meeting the requirements of the PAV to that of "high-purity air", depending on how it is produced.

➢ Pressure Management and Delivery

Some form of pressure regulation must be provided since the delivery cylinders or bottles generally provide initially high pressure air compared to the 2.2 - 2.4 MPa required by the PAV, The standards for these devices vary widely according to local and regional governments, so Prentex cannot furnish pressure regulators for use outside of North America. We do provide a connecting supply hose and adaptors to hopefully make it easier to connect the hose to the locally procured pressure regulator, via SI or British standard connectors. The regulator should be equipped with the following as a minimum:

[1] supply pressure gauge to monitor the relative quality of air remaining in the cylinder; [2] delivery pressure gauge to verify delivered pressure is within 2.2 to 2.4 MPa range,

[3] a pressure-relieving device (often called a 'rupture disk' or 'relief valve') to prevent excessive pressure to the supply hose.

➢ Quantity

The Prentex Model 9300 PAV Systems are generally well-sealed with a minimum of user maintenance. In the U.S, a compressed air cylinder of a size similar to that described earlier and with newly filled pressures in the same range, may supply enough air for approximately **20 PAV** aging operations. Thus, one cylinder should be sufficient for the initial set-up and training, but it is always advisable to have spare cylinders of air in stock.