



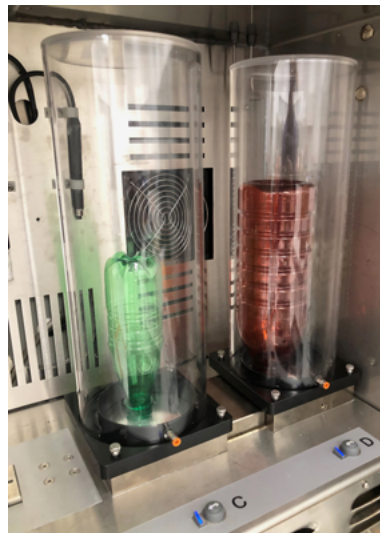
PACKAGE TEST CARTRIDGES: ENVIRONMENTAL PACKAGE TEST CHAMBER

Creating a Custom Test Environment

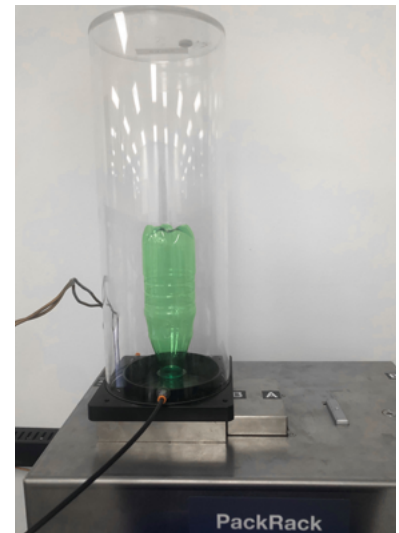
Generating your own package permeation testing environment has never been easier. The package test chamber allows the user to modify the permeant concentration (e.g. 5% or 100%) as well as the relative humidity in a stable micro environment. This innovative test chamber can be used with both package analyzers and film analyzers when in conjunction with the MOCON® PackRack®. The sample must fit within a 10 cm diameter by 35 cm tall footprint. Perfect for testing bottles or small cups for 100% RH as well as 100% CO₂ or 100% O₂ challenges for high barrier structures. The gas inlet allows low-concentration tank-gas permeation testing for high transmitting structures.

Benefits

- Allows package barrier testing at 100% RH
- Accommodates package testing with specific permeant gas concentrations
- Increases test gas stability vs using poly bags to create package environment
- Increases measurement sensitivity for high barriers (100% O₂ vs. 100% CO₂)



(Fig. 1) 100% RH permeation testing



(Fig. 2) High barrier bottle testing with 100% CO₂

ENVIRONMENTAL TEST CHAMBER MAINTAINING A STABLE TEST ENVIRONMENT

Traditional 100% Permeant Concentration Testing



(Fig. 3) Historical testing using bags to create test gas environment.

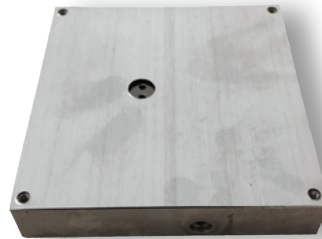
When testing packages traditionally, one had to solder tubing through a brass plate and mount the package to the plate over the purge lines with epoxy. To set up challenge environments, one had to have tubing feeding the 100% O₂ gas into the bag or placing a wet sponge inside the poly bag with the sample and cinch the bottom to create the desired driving force (respectively).

Poly bags permeate test gas to some degree, thus lowering the stability of the driving force during the test. The innovative package test chamber allows stable 100% permeant testing since oxygen, carbon dioxide and moisture will not permeate the test chamber to a measurable level.

Environmental Test Chamber: Micro Environment Setup

AMETEK MOCON has developed a new bottle permeation test approach which still uses epoxy to seal the package over the purge gas while eliminating tubing, nuts and ferrules. Our patented TruSeal® technology within the cartridge potentially decreases test time, increasing throughput.

Test small aspirin bottles, 2-liter soda bottles, shampoo bottles, gallon jugs and small trays if the diameter of the opening is less than 4" (Fig. 4C).



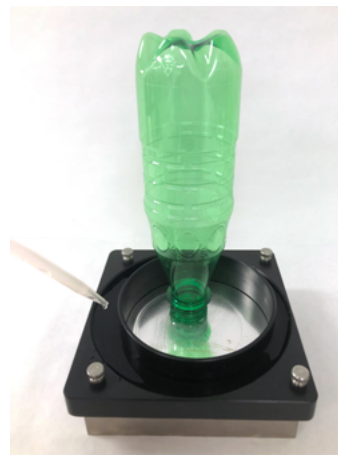
(Fig. 4A) Thin metal plate on cartridge



(Fig. 4B) Bottle epoxied on thin plate

Using the Package Test Chamber:

1. Epoxy sample onto thin metal plate over hole
2. Grease cartridge base and install package sample on thin metal plate
3. Align the water reservoir over the corner holes
4. Secure test chamber over sample into reservoir
5. Plumb in test gas (e.g. 100% CO₂ or O₂ gas) or add water to reservoir for 100% RH



(Fig. 4C) Adding water to reservoir



(Fig. 4D) 100% RH bottle testing setup

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Two Ways to Supply Test Gas

With the swap of the port on the cartridge chamber, the test gas can be supplied with two ways:

- To test at WVTR at 100% RH, use the water refill port to add water during a test (Fig. 5A).
- To test TR with other test gases (e.g.: 100% CO₂ or O₂), use the quick connection and gas supplying line (Fig. 5B).



(Fig. 5A) Port for water refilling



(Fig. 5B) Quick connection & gas line for test gas

Applications

Evaluating barrier coatings for bottles and containers is vital for determining shelf life. A large percentage of package permeation testing takes place at ambient conditions within a temperature- and humidity-controlled lab (e.g. 23°C/50% RH). There are scenarios when different challenge conditions are necessary to test package barrier properties for certain applications.

Understanding package barrier behavior against more aggressive challenges may be vital for accurate shelf-life calculations. Often, when characterizing high barrier coatings for Oxygen Transmission Rate (OTR), or Carbon Dioxide Transmission Rate (CO₂TR), 100% concentration gas is used to gain sensitivity versus using room air. Analogously, 100% RH is often used for Water Vapor Transmission Rate (WVTR).

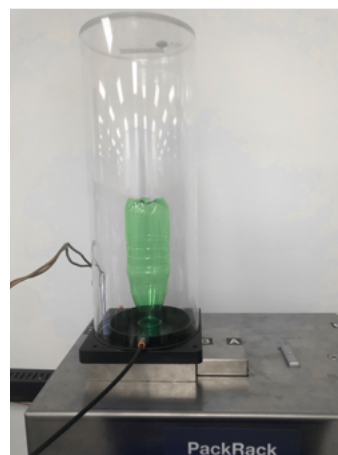
The chamber comes equipped with a quick connect orifice to plumb in permeant gas from an external source or film instrument when used in conjunction with a PackRack (Fig. 8). Evaluating rigid package coatings has never been easier. Over longer tests, the rigid shell keeps the permeant driving force more consistent since it will not readily permeate oxygen, carbon dioxide, or water vapor. This package chamber cartridge also may be used with package instruments to allow 100% RH testing (Fig. 6 – 7).



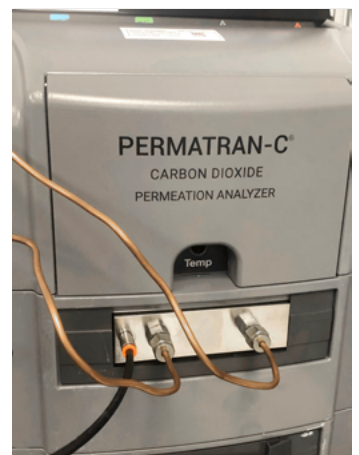
(Fig. 6) High temperature high humidity bottle testing



(Fig. 7) 100% RH test setup



(Fig. 8) Providing 100% CO₂ gas from instrument



(Fig. 9) 100% CO₂ gas outlet from instrument

ENVIRONMENTAL TEST CHAMBER MAINTAINING A STABLE TEST ENVIRONMENT

Applications, Continued

The limiting factor is package size as the chamber has cylindrical dimensions of 4" diameter and 11" tall. Carbonated bottle barrier testing and other high barrier package testing applications, such as small multi-layered cups or trays and drug delivery housings can be evaluated in their own stable micro environments.



(Fig. 10) High barrier OTR testing with PackRack



(Fig. 11) High humidity OTR bottle testing

Cartridge	80 cm ² base	Each	Set of 4
Test Chamber Cartridge for Empty Packages	included	054-269	054-589
Test Chamber Kit for Empty Packages	order separately	054-599	-
80 cm ² base	-	052-721	-

Thin Foil Plate	With hole	No hole
80 cm ² , 10 pack	052-707	052-708

Our experts listen to your needs and offer customized solutions.

At AMETEK MOCON, we continually expand our extensive cartridge line based on customer testing requirements to ensure accurate and consistent test results. With over 55 years of industry experience behind the designs, our interchangeable cartridges address general industry challenges as well as specific customer requests.



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AB-PPS-0179-Package Test Cartridges: Environmental Chamber-0525-1.0

AMETEK MOCON
7500 Mendelssohn Ave. N
Minneapolis, MN 55428 USA
info.mocon@ametek.com
www.ametekmocon.com