

# Gasoline Gas Permeation Rate of KEPITAL

**R&D Center**

## 1. Introduction

KEPITAL® is the trade name for the polyacetal copolymer products produced by Korea Engineering Plastics Co., Ltd.

KEPITAL® has well-balanced physical and mechanical properties combined with a powerful combination of highly crystalline and thermally stable structures. KEPITAL provides not only excellent mechanical and physical properties but also resistance to various chemicals and a wide processing window.

- (1) Test institute : K3works in Germany
- (2) Test fuel : CARB Phase III (gasoline containing 10 % ethanol)
- (3) Test specimen:  $\varnothing = 100 \text{ mm}$ ,  $t = 3 \text{ mm}$
- (4) Emission regulation: R.Bosch ( $0.3 \text{ g} \times \text{mm}/\text{m}^2 \times \text{day}$ )
- (5) Test method
  - 1) Pre-test : Helium leak check for all interfaces prior to emission test
  - 2) Aging, stabilization: Fuel for aging, preconditioning and Test materials attached to fuel reservoir with 80mm of inner diameter
  - 3) Test Fuel : CARB Phase III
  - 4) Refuel of fuel reservoir every 4 weeks, storage at 40°C for 20 weeks
  - 5) Emission test: 1 x 24h emission test cycle with each sample at 60°C in Micro-SHED

## 2. Test Setup

- (1) Result of Helium leak check : Pass
  - 1) Samples were attached to the fuel reservoir
  - 2) The fuel reservoir was pressured with He to an overpressure of 50 mbar
  - 3) Spec. : Exhibit a He leak rate smaller than  $10^{-5} \text{ L} \cdot \text{mbar}/\text{s}$
- (2) Conditioning and Storage
  - 1) The fuel reservoirs were filled up to 40% of their capacity with CARB Phase III
  - 2) Conditioning in the 40°C aging room



Sample sealed and prepared for soaking



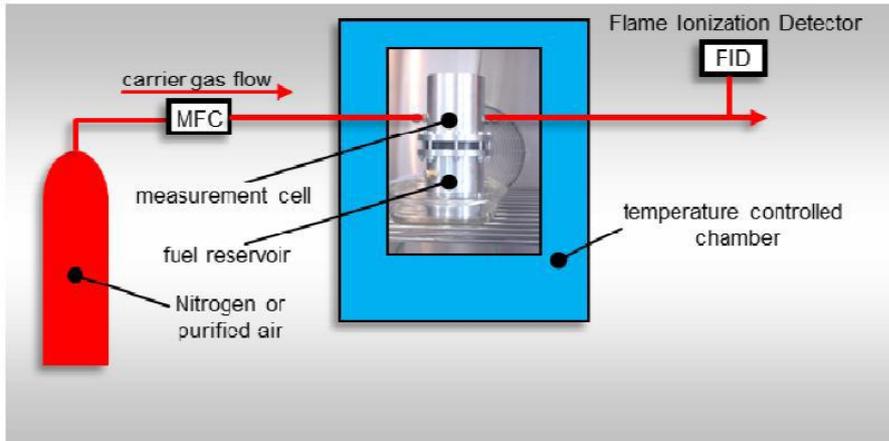
Samples in the preconditioning room (40°C)

### 3. Test Method

- (1) Refilled with new test fuel 6 to 24 hours before Micro-SHED test
- (2) Conditioned at room temperature
- (3) O-ring seal was placed between the adaptor plate and the test cell
- (4) Connected the venting line at the fuel reservoir and the carrier gas ports
- (5) Conducted the permeation test at 60°C



Sample inside Micro-SHED for emission test



Measurement principle : Carrier gas method

### 4. Test Result

Materials	F10-03H	F25-03	F20-03	FR-20H
Permeation rate[mg/d]	0.9	1.1	1.1	1.5

Permeation rate at 60°C after 20 weeks of soaking

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