

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 ($0.3 \text{ g} \times \text{mm/m}^2 \times \text{day}$)
- (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 $10^{-5} \text{ L} \cdot \text{mbar/s}$
- (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



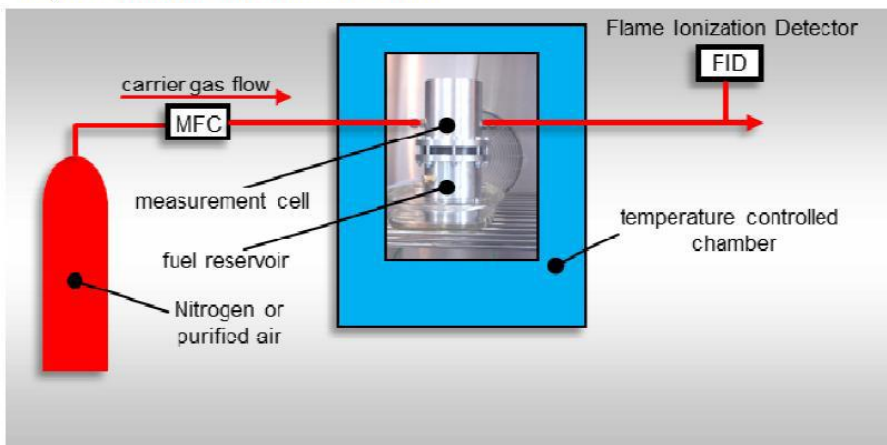
Samples in the preconditioning room (40°C)

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

HQ

Mapo-daero 119 (Gongdeok-dong) Hyeoseong Bldg.
Mapo-gu, Seoul, Korea
Tel 82-2-707-6840 ~ 8, Telefax 82-2-714-9235

KEP Americas

106 North Denton Tap Road Suite 210-202 Coppell,
TX 75019, USA
Tel +1 888 KEPITAL, Telefax +1 888 537-3291

KEP Europe GmbH

Rheingaustrasse 190-196 D-65203 Wiesbaden, Germany
Tel +49 (0)611 962-7381, Telefax +49 (0)611 962-9132

KEP China

A1905, HongQiao Nanfeng Plaza, 100 Zunyi Road,
Shanghai, China
Tel +86 21 6237-1972, Telefax +86 21 6237-1803

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