Online Version

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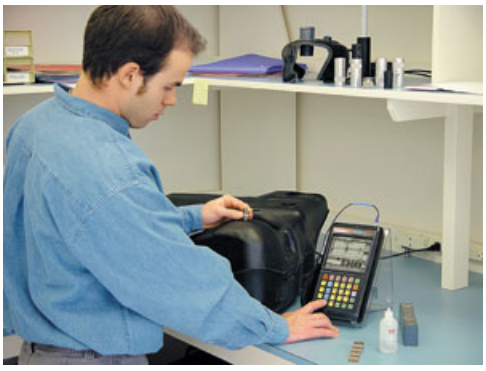
# 자동차 연료 탱크 두께 측정



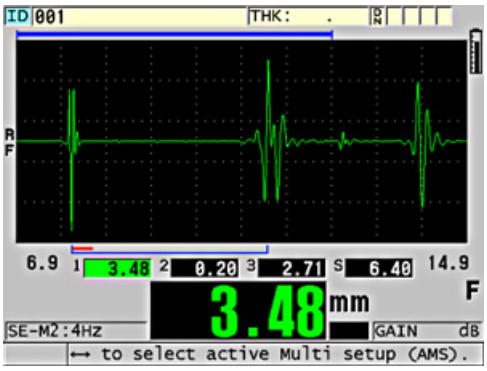
**Application:** Measurement of individual layers and total thickness in multilayer plastic automobile fuel tanks.

**Background:** Most contemporary automobile fuel tanks are fabricated with a multilayer plastic construction, typically made of two structural layers of high density polyethylene (HDPE) surrounding a thin gas barrier layer made of ethylene vinyl alcohol (EVOH). The purpose of the barrier layer is to prevent the slow leakage of gasoline vapor through the polyethylene wall. The HDPE structural layers are typically in the thickness range 0.1 in. to 0.2 in. (2.5 to 5 mm), and the EVOH barrier layer is typically 0.004 in. to 0.012 in. (0.1 to 0.3 mm). Tank manufacturers need to measure both the thickness and the depth of the barrier layer.

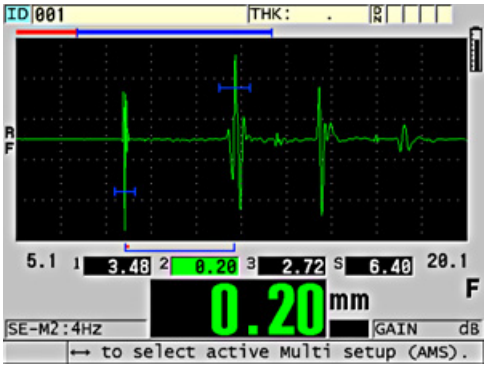
**Equipment:** The **Model 38DL PLUS** **ultrasonic thickness gage** with the Multi-Measurement software option is recommended for simultaneous measurement of individual layers and total tank thickness in this application. With this software, the 38DL PLUS gage is capable of using separately programmed setups (including sound velocity, gain, and blanking settings) for each layer being measured to optimize performance. In this test, the gage is most often used with an M2017-RM (20 MHz) delay line transducer. Contact Olympus for gage setup assistance.

**Typical Procedure:** The waveforms below show measurements of structural and barrier layers in a typical automobile fuel tank using appropriate setups. The gage's frequency-based barrier measurement mode is used to read the barrier layer whenever its thickness is less than approximately 0.010 in. (0.25 mm). Barrier depth is measured with a conventional Mode 2 setup, and the thickness of the inner polyethylene layer is also measured in Mode 2. Thick barrier layers, greater than approximately 0.010 in. (0.25 mm) may also be measured in Mode 2. Note that because of low pass filtering effects in the outer polyethylene wall, the minimum measurable barrier thickness will usually be approximately 0.004 in. (0.100 mm).

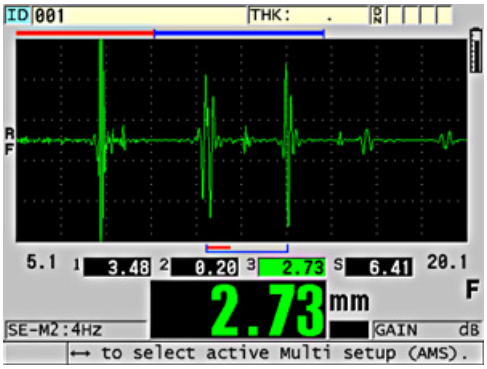
The reflection ratio at the boundary between any two materials is determined by the relative acoustic impedances of those materials. Because virgin and regrind material have essentially identical acoustic impedances, it is not possible to separately measure regrind layers. Also, adhesive layers adjacent to barrier layers are generally too thin and/or too closely impedance matched to measure with ultrasonic techniques and cannot be resolved.




outer polyethylene layer




barrier layer (frequency domain measurement)




inner polyethylene layer

As with any ultrasonic thickness measurement, accuracy is dependent on proper sound velocity calibration. Velocity calibration must be performed for each material being measured, on samples of known thickness.

# Related Product

## 38DL PLUS

다용도로 활용 가능한 38DL PLUS™ 측정기를 이중 요소 탐촉자와 함께 사용하면 부식된 파이프의 두께를 측정할 수 있으며, 단일 요소 탐촉자를 사용하면 박층 또는 다층 소재의 두께를 매우 정확하게 측정할 수 있습니다.

더 알아보기 ▸ https://www.olympus-ims.com/$lang/38dl-plus/

## 45MG

45MG 고급 초음파 두께 측정기에는 표준 측정 기능은 물론 다양한 소프트웨어 옵션이 있습니다.이 독특한 두께 측정 도구는 당사의 이중 요소 및 단일 요소 두께 측정 탐촉자와 호환됩니다.

더 알아보기 ▸ https://www.olympus-ims.com/ko/45mg/


## Magna-Mike 8600

Magna-Mike™ 8600 홀 효과 두께 측정기로는 자기 프로브를 사용하여 플라스틱 병과 같은 비철 및 박막 소재의 두께를 정확하게 측정할 수 있습니다.

더 알아보기 ▸ https://www.olympus-ims.com/magna-mike8600/


## 72DL PLUS

72DL PLUS™ 고급 초음파 두께 측정기는 사용이 간편한 휴대용 장치로 빠르고 정밀하게 두께를 측정합니다.최대 125MHz의 단일 요소 탐촉자와 호환되는 이 혁신적인 두께 측정 도구는 다층 도장, 코팅, 플라스틱과 같은 초박막 소재의 두께의 측정에 매우 적합합니다.최대 6층의 두께를 동시에 표시할 수 있습니다.

더 알아보기 ▸ https://www.olympus-ims.com/72dl-plus/