

An Analysis of Performance Trends in the Replacement Tire Market Following European Automotive Environmental Regulations

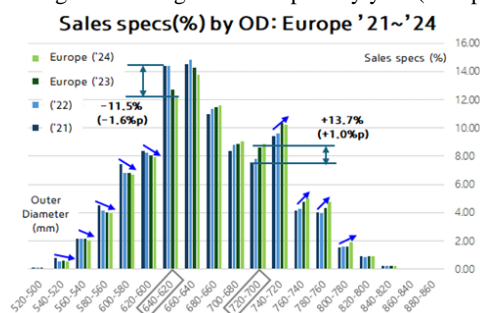
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In Europe, environmental regulations for vehicles have become increasingly stringent. These regulations directly impact tires, targeting key performance indicators such as rolling resistance and external noise. As a result, vehicle manufacturers are setting higher development targets for their tires. However, as tires are consumable products, they require periodic replacement. Therefore, it is necessary to verify whether the performance of replacement tires in the consumer market is keeping pace with these stricter regulations. For this study, data on commercially available tires were collected from the consumer market over a four-year period. The results show that the average rolling resistance of replacement tires improved by 11%, while noise levels remained stable. Additionally, the market share of tires with a larger outer diameter increased by 13.7%. This improvement in rolling resistance can likely be attributed to Regulation (EU) 2019/631.

Fig.1 Percentage of sales specs by year (Europe)



In Europe, the proportion of tires sold in the 620-640 mm outer diameter(OD) range decreased by -11.5% from 2021 to 2024, while the proportion of tires sold in the 700-720 mm outer diameter range increased by +13.7% over the same period. (Fig.1)

The same phenomenon was observed in the United States, where tire outer diameters between 660 mm and 680 mm shrank by -9.5% in 2024 compared to 2021, while tires between 720 mm and 740 mm increased by +7.7% over the same period.

As a result of vehicle CO₂ regulations, the tires available to consumers are also moving toward better a fuel efficient performance. The average value of 3.12 in 2024 represents an 11% improvement over the average value of 3.49 in 2021. (Fig.2)

The correlation between fuel efficiency grade and outer diameter is uniform across years. As the outer diameter increases, the average fuel efficiency grade of tires decreases (from 3.51 for 600 mm to 2.99 for 700 mm in 2024, -15%).

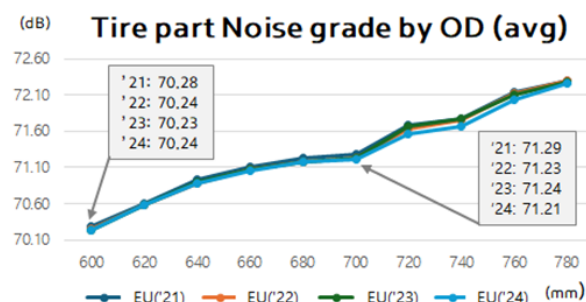
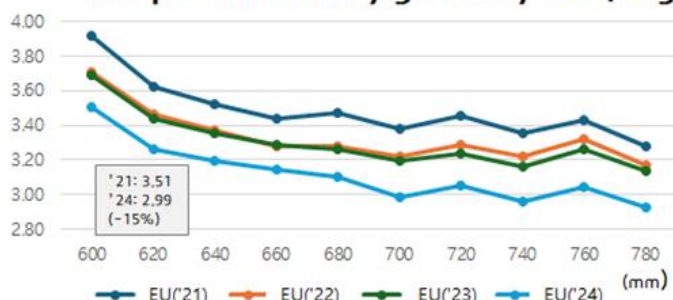


Fig2. Tire part Efficiency grade (four-year comparison)

Tire part Efficiency grade by OD (avg)



The external noise level of the pattern is certified through a Pass By Noise (PBN) test, similar to fuel economy ratings, and is expressed as a single labeling rating and certified value in dB.

The certified dB values were averaged across tire diameter bands. The average certified value for a 600 mm outer diameter is 70.28 dB, while the certified value for the 780 mm specification is 72.31 dB.

The difference between the 2021 average value of 71.34 dB and the 2024 average value of 71.27 dB is 0.1% (0.07 dB), which is less than the change in fuel economy rating. (Fig.8)

Fig3. Tire Rolling Noise grade average (four-year comparison)