

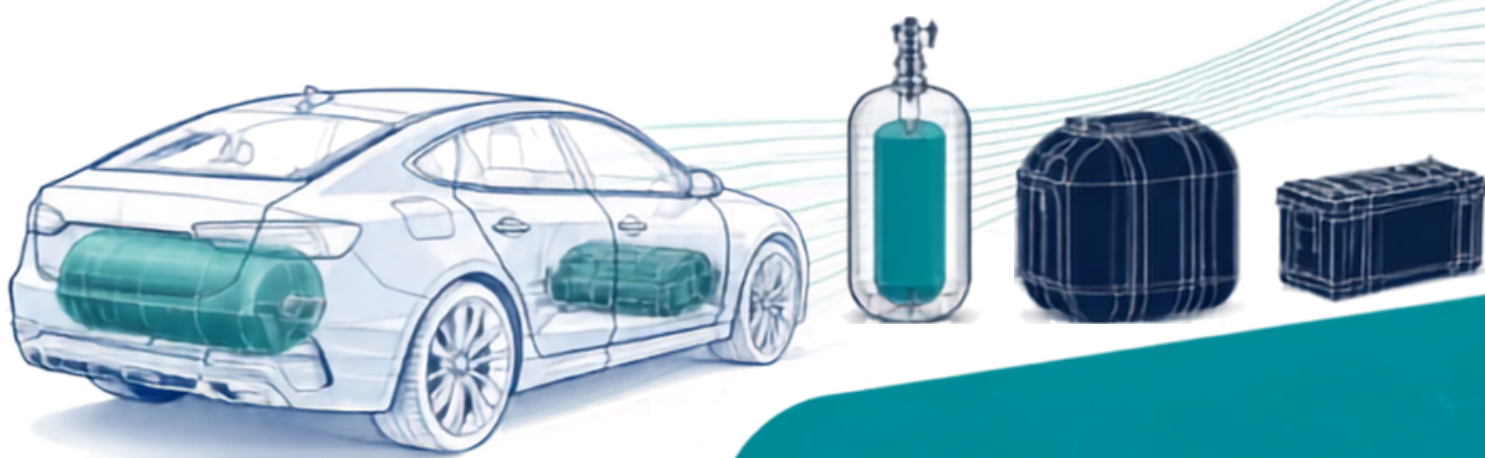
Position Paper

Methanol-Containing Fuel Blends and the Compatibility Gap with Plastic Fuel Tank Systems in EU Vehicle CO₂ Regulation

The current EU debate on CO₂ standards for vehicles (Regulation 2019/631) and the parallel discussion on alternative fuels is proceeding without any consideration of a critical technical reality: fuel blends containing methanol can cause evaporative emissions from plastic fuel tank systems that far exceed the limits verified at type-approval. This is not a hypothetical concern but a material compatibility issue rooted in how plastic tank components interact with methanol at concentrations above what current type-approval test fuels represent.

Current fuel specifications already permit a limited share of methanol in fuel, yet this allowance is barely used in today's market. This is expected to change as alternative fuels become more widespread, since methanol is a comparatively simple and low-cost option for producing such fuels. This significantly increases the risk that methanol-containing fuel blends will actually reach the market, rather than remaining a theoretical allowance that goes unused.

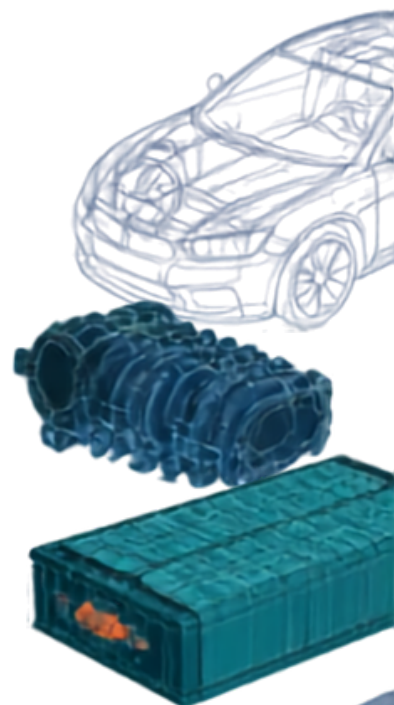
PlasEnSys is issuing this Methanol-containing position paper to emphasise that no actor currently engaged in the CO₂ rule-making process is factoring fuel tank behaviour and methanol/plastics compatibility into the framework taking shape. We ask that this gap be formally recognised and addressed before it becomes a compliance liability.



The Problem

Type-approval evaporative emission testing is carried out using a defined reference fuel (for example, an ethanol blend such as E10). This test fuel does not reflect the full range of fuels that vehicles may actually encounter once in service, particularly as alternative fuels enter the market. Methanol blends are already permitted in limited quantities under the EN 228 fuel specification, which allows up to 3.0% (V/V) methanol content. Should cheaper methanol-containing fuel blends become commercially available, nothing in the current fuel specification or type-approval framework prevents much higher methanol concentrations from being used at the pump.

Plastic fuel tank systems that have not been validated against these higher methanol concentrations can permeate and evaporate at levels well beyond the certified limits. The risk is compounded by a “soaking” effect: a tank conditioned with a high-methanol blend can continue to produce elevated evaporative emissions even if a subsequent in-service test is run on a compliant reference fuel such as E10. Therefore, prior exposure to an uncontrolled fuel can undermine the validity of a test that looks compliant on paper.



Where the Risk Materialises

This is not primarily a laboratory or type-approval problem. The core exposure is at in-service conformity and in-use compliance testing through the checks that authorities may run on vehicles already on the road, fuelled with whatever blend the driver has actually put in the tank.



A vehicle can pass type-approval cleanly by being tested on the prescribed reference fuel, regardless of what is actually sold at filling stations.

Once in service, the same vehicle may be filled with a much higher-methanol blend than the Regulation assumes, particularly wherever methanol-containing fuel blends are marketed as a lower-cost alternative.

If regulators begin in-use or in-service conformity testing (as is already occurring in some markets outside the EU), vehicles with tanks not designed for these blends risk failing compliance despite having passed type-approval.



The Chinese market provides an early illustration: methanol fuel is already available there, and the in-use emissions risk is a present reality rather than a projection. In the EU, methanol availability at the pump is currently more limited, which keeps the immediate risk lower; nonetheless, the underlying vulnerability is structural and would apply wherever methanol-containing fuel blends reach the market, including in Europe if they become commercially attractive.



It is also worth noting that the fundamental issue is not the evaporative emission test procedure itself. The test method is not in question. What is missing is control over the actual fuel composition a vehicle will encounter over its in-service life, which is an uncontrolled variable that today's testing regime does not account for.





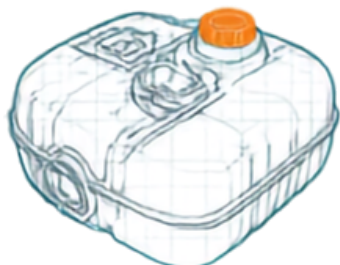
The Regulatory Gap

Across the ongoing revision of the Regulation on CO₂ Emission Performance Standards for New Passenger Cars and Vans, fuel tank material behaviour and methanol/plastics compatibility do not currently feature as a consideration. The regulatory conversation is focused on emissions performance and fuel definitions for compliance testing, but not on whether the physical components of the fuel system, including plastic tanks, can withstand the fuels that the alternative fuels agenda is actively trying to bring to market.

This is a structural blind spot: alternative fuels policy is advancing the case for higher-concentration methanol-containing fuel blends as a decarbonisation pathway, while vehicle emissions and type-approval policy continues to test and certify against reference fuels that do not reflect this trajectory. Left unaddressed, the two policy tracks are on a collision course, with fuel tank compatibility caught in between and effectively invisible to both.

In consideration of the above, PlasEnSys holds that:

- Fuel tank material compatibility with methanol-containing fuel blends must be explicitly recognised as a component of the CO₂ Regulation and alternative fuels policy discussion, not treated as a downstream engineering detail.
- Type-approval test fuel definitions should be reviewed against the realistic range of methanol concentrations that alternative fuels policy is seeking to enable, including blends beyond current EN 228 limits.
 - In-service conformity and in-use compliance testing protocols should account for real-world fuel variability and the residual (“soaking”) effects of prior exposure to non-reference fuel blends, not only the fuel used on the day of the test.
 - PlasEnSys calls for methanol to be prohibited as a fuel constituent. Given the demonstrated material compatibility risk with plastic fuel tank systems across their full in-service life, no expansion of permitted methanol content in fuel specifications should be pursued, regardless of tailpipe or evaporative performance under a single reference fuel.
 - Policymakers should be engaged directly to ensure fuel tank and material compatibility experts have a formal seat in the ongoing CO₂ and alternative fuels technical discussions.



Addressing this gap now, while methanol-containing fuel availability in Europe remains limited, is significantly less costly and disruptive than addressing it after in-use non-compliance becomes visible in the field.