European Committee for Standardization

The CEN E20 petrol specification for Europe

Rod Williams, Convenor CEN E20 Task Force & Charlotte Koppen, Secretary CEN WG21

Development of a CEN E20 petrol specification for Europe - Overview

- Introduction
  - CEN & fuel standards
  - Why E20 for Europe?
  - E20 viability
- E20 Technical Specification requirements
  - Principal differences to EN228
  - Oxygen and oxygenates
  - RON and MON
  - Water content and corrosion protection
  - Hydrocarbon content and final boiling point
  - Volatility
- Summary & next steps

CEN & fuel standards

“CEN, the European Committee for Standardization, is an association that brings together the National Standardization Bodies of 34 European countries.”

“CEN provides a platform for the development of European Standards and other technical documents in relation to various kinds of products, materials, services and processes.”

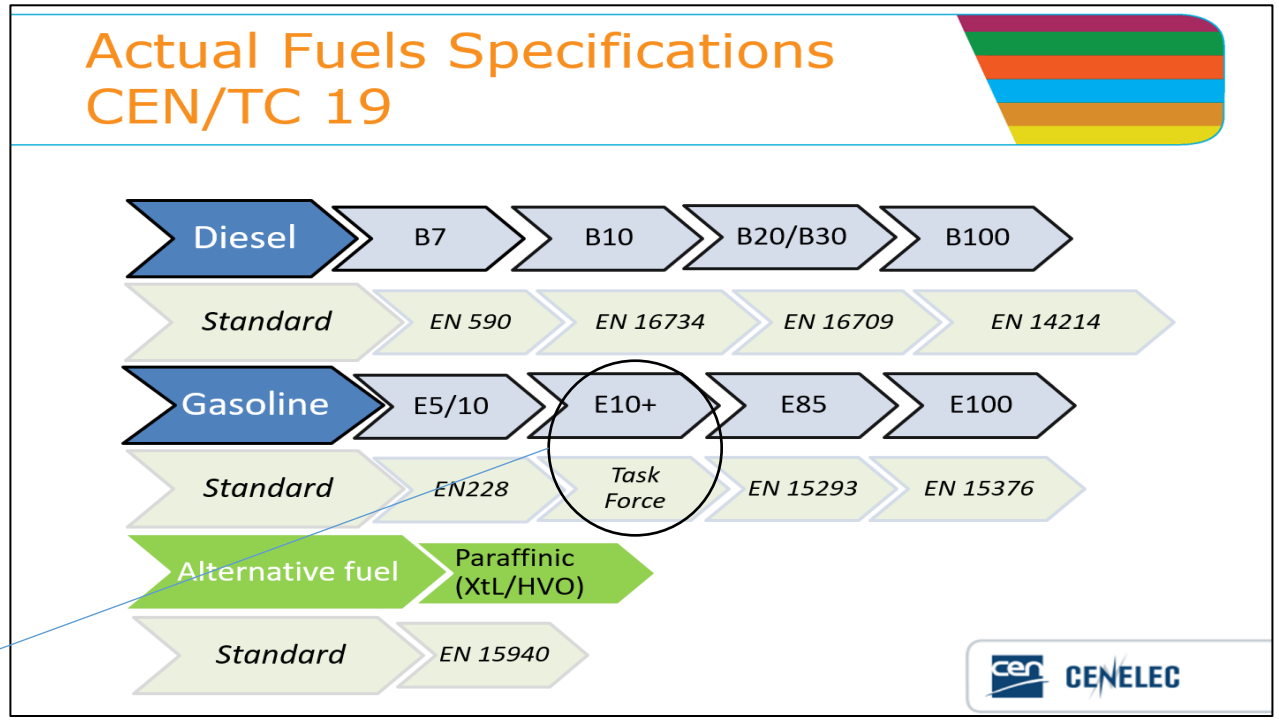
EUROPEAN COMMITTEE FOR STANDARDIZATION

CEN Technical Board

CEN TC/19 - PETROLEUM PRODUCTS, LUBRICANTS AND RELATED PRODUCTS

WG21 – Specification for unleaded petrol

E10+ (E20) Task Force

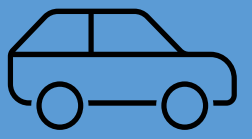


Group of experts representing CEN countries including members from fuel, biofuels, automotive industries & liaison organisations – Task to develop Technical Specification and underpinning Technical Report

[About CEN - CEN-CENELEC (cencenelec.eu)]

Why E20 for Europe?

- BEVs are supplanting cars with ICEs, but that leaves huge scope to decarbonise ICE-powered cars.
- Increasing the allowable fuel oxygenate content constitutes decarbonisation potential for petrol-fuelled cars: -
  - Displacing fossil fuel content
  - Substituting carbon-intensive higher-octane fossil molecules for oxygenates
  - Potential to facilitate inclusion of lower-octane renewables such as bio-naphtha



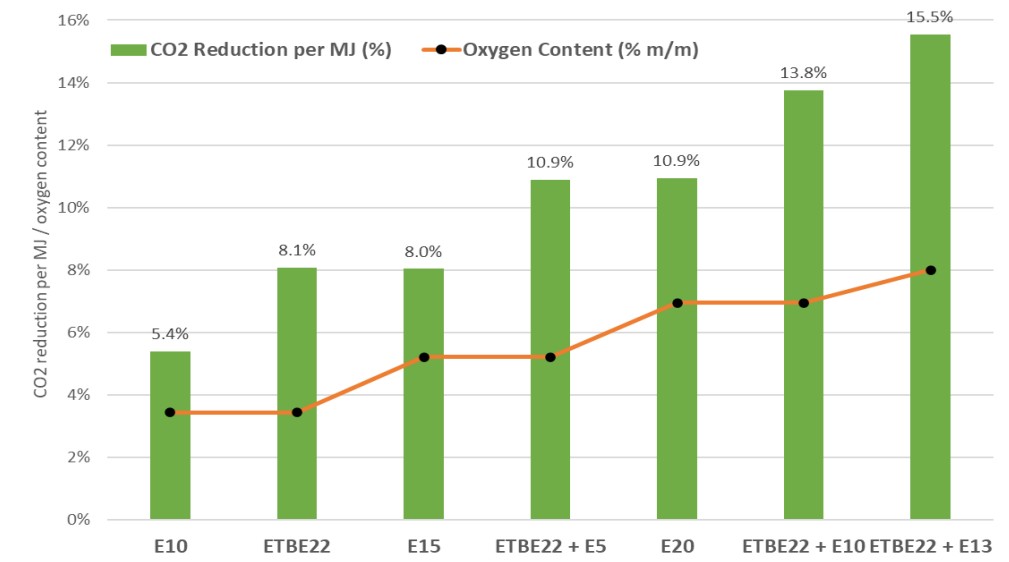
294M

>50% petrol fuelled

2023, EU+EFTA+UK

ACEA Report - Vehicles on European roads 2025.pdf

Example oxygen contents & CO2 WTW benefits for a range of fuels meeting the oxygenate and oxygen ranges permitted in the E20 TS



E20 Viability

The prospect of E20 is a matter of adopting practices from elsewhere, rather than tackling an unknown or unproven concept…..

- Oxygenates such as alcohols and ethers have long been included in the European fuel pool, including co-blending.
- Fuels containing ethanol above 10% (V/V) are well established in other geographies: E15 in the US, E27 & E100 in Brazil, E20 in India and Thailand.
- E85 is also used within and outside Europe.

A Technical Specification is now available, since the CEN E20 TS was approved via NSB ballot on 7th Nov 2025. But there are some necessary steps remaining to bring E20 into the European market…

- Revising the EU Fuel Quality Directive to legalise E20
- Confirming a sufficient proportion of the vehicle fleet is E20 compatible/tolerant
- Readying fuel production and distribution infrastructure and systems

NSB: National Standardisation Body

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E20 TS vs EN228 Principal Differences

Property	Units	EN 228 E10		E20 TS	
		Min	Max	Min	Max
Ethanol content	% (V/V)	-	10	-	20
Oxygen content	% (m/m)	-	3.7	3.7	8.0
RON	-	95	-	98	-
Water content	% (m/m)	-	-	-	0,200
% evaporated at 70°C E70 (Class A-B)	% (V/V)	20	50	20	68
% evaporated at 70°C E70 (Class C-F)	% (V/V)	22	52	22	68
% evaporated at 100°C E100	% (V/V)	46	72	46	75
% evaporated at 150°C E150	% (V/V)	75	-	80	-
Final Boiling Point	°C	-	210	-	200

- EN 228 C5+ ether limits are adopted for the E20 TS at max 22% V/V

Oxygen and oxygenates

- Max ethanol limit was set at 20%v/v as a level at which there is broad experience globally
- Including a minimum ethanol limit was debated at length but finally rejected due to challenges over anti-competitiveness
- Introducing a minimum oxygen level (3.7%m/m) limits the overall potential oxygen range and therefore the uncertainty for vehicle calibration and OBFCM
- A maximum oxygen limit of 8%m/m accommodates E20 or combinations of ethers and ethanol and provides headroom for variations in base fuel density
- EN 228 C5+ ether limits are adopted for the E20 TS at max 22% V/V

Property	Units	EN 228 E10		E20 TS	
		Min	Max	Min	Max
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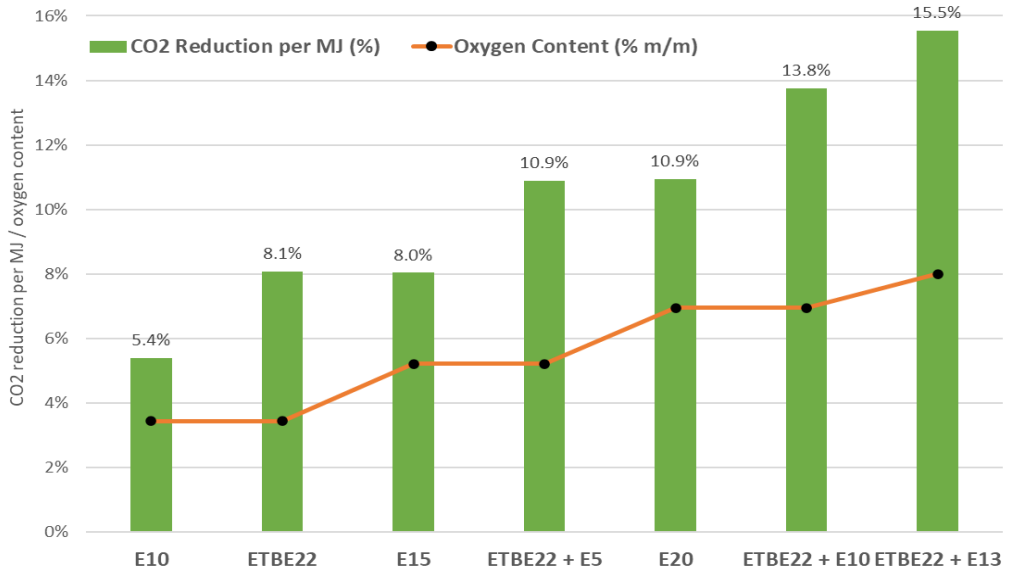
Example oxygen contents & CO2 WTW benefits for a range of fuels meeting the oxygenate and oxygen ranges permitted in the E20 TS



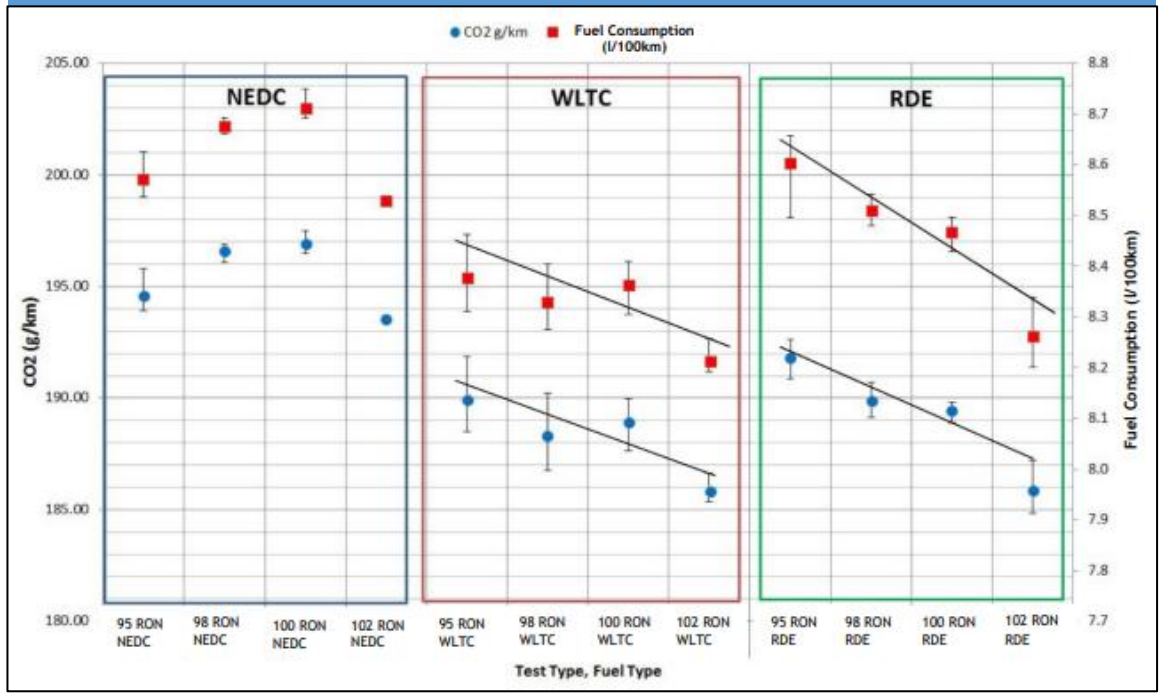
ETBE – Ethyl Tertiary Butyl Ether

OBFCM - On-Board Fuel Consumption Monitoring

RON and MON

- Oxygenates are typically high RON – 10% ethanol improves a typical fossil petrol by around 3 units, 22% ETBE by 6 units.
- Decision to set RON min to 98 to offset some of the volumetric fuel economy loss associated with oxygenates.
- A proposal was made to increase MON above the EN 228 minimum of 85 to mitigate LSPI risk.
- However, increasing the MON minimum limit would reduce the fuel sensitivity (RON-MON) and therefore the potential for increasing efficiency associated with higher RON fuel.

RON CO2/Fuel Consumption benefits in an advanced engine (CR12.2:1) Concawe Report 8/20 report layout



Property	Units	EN 228 E10		E20 TS	
RON	-	95	-	98	-
MON	-	85	-	85	-

RON/MON – Research/Motor Octane Number

LSPI – Low Speed Pre-Ignition

Water content and corrosion protection

- Parameters affecting steel corrosion propensity are controlled in the ethanol specification, but not in EN 228.
- In fuels containing higher levels of ethanol, there is an additional risk of corrosion when water separation occurs.
- There are no inherent issues with corrosion in European (E10) or US (E15) fuels, but corrosion problems can occur in other (developing) markets.
- Control of water contamination was deemed to be the most appropriate measure to achieve corrosion protection, complemented by further guidance wording….

Property	Units	EN 228 E10		E20 TS	
Water content	% (m/m)	-	-	-	0,200

E20 TS corrosion guidance wording

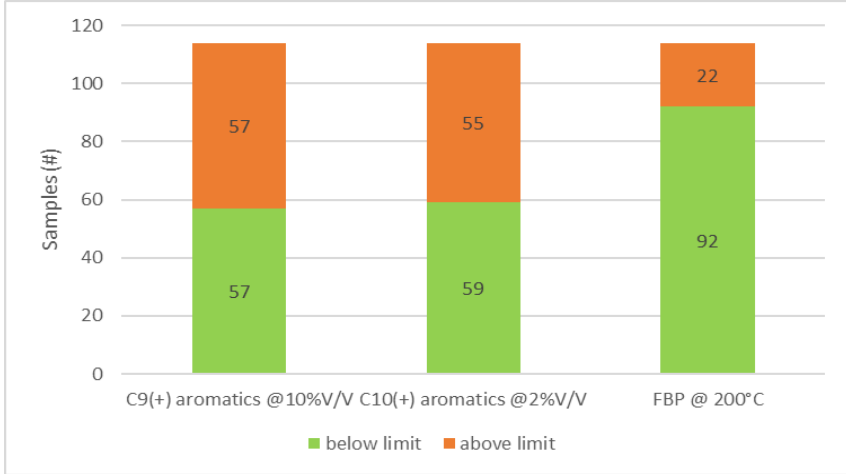
"Given the known potential for some petrol to absorb water, the use of anticorrosion additives may be used to prevent corrosion.
This is particularly important in the case of fuel containing higher ethanol content above 10%V/V. Furthermore fuel complying to this document, contains less than 0,200 % (m/m) water. If a risk of corrosion be suspected, NACE TM0172 steel corrosion tests can give further guidance towards the use of anticorrosion additives."

Hydrocarbon content and final boiling point

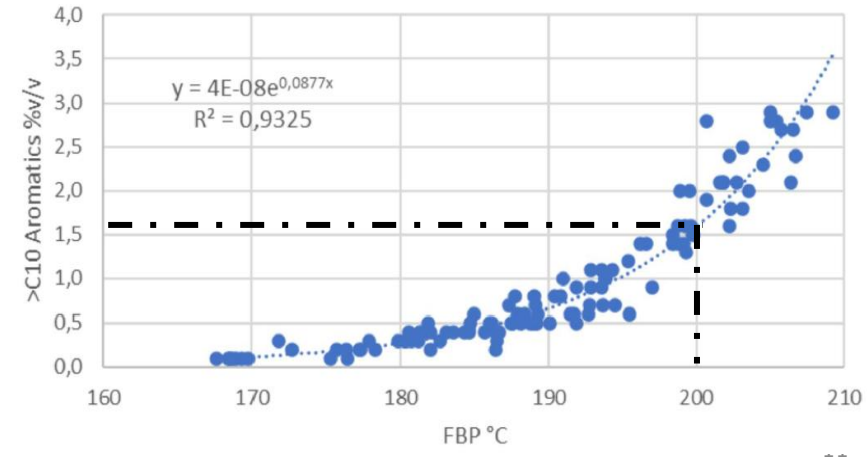
- Some tighter/new limits were proposed with respect to olefins, total and higher aromatics and FBP to reduce exhaust particulate emissions and limit low speed pre-ignition (LSPI) risk.
- Market survey data showed that for 114 fuels sampled, around half would not comply with the proposed C9+ and C10+ aromatic limits, whereas applying an FBP limit of 200 °C would affect fewer fuels.
- A strong correlation is observed between C10+ aromatics and FBP, therefore setting a FBP maximum limit of 200°C was applied to control fuel properties most affecting particle production and LSPI risk.

Property	Units	EN 228 E10		E20 TS	
Final Boiling Point	°C	-	210	-	200

Potential impact of limiting C9+ & C10+ aromatics and FBP (SGS)



Correlation between C10+ aromatics and FBP (SGS)

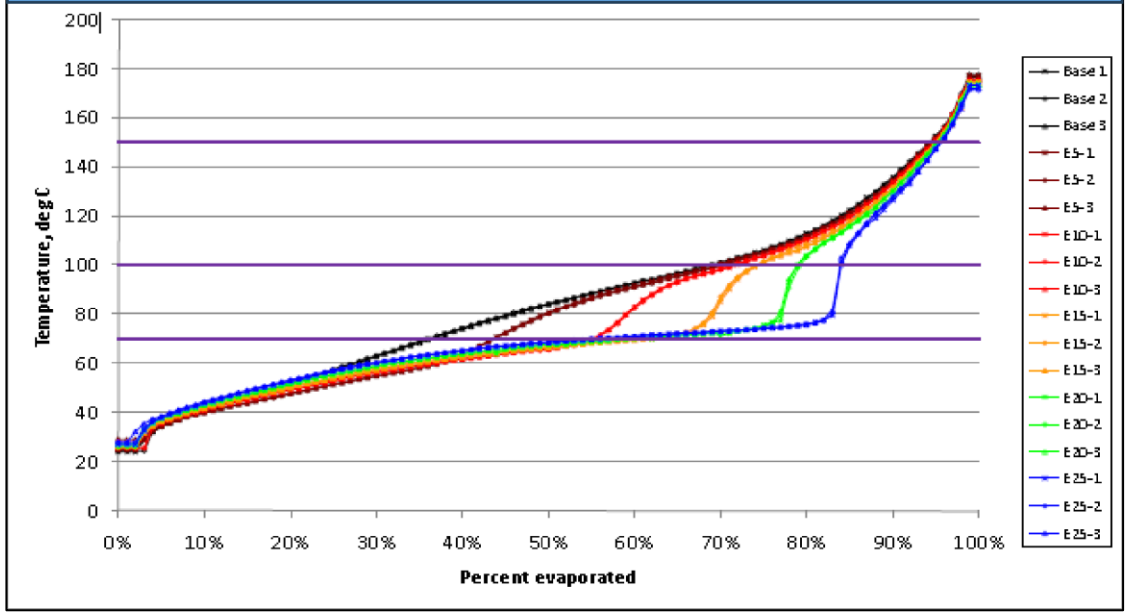


Volatility

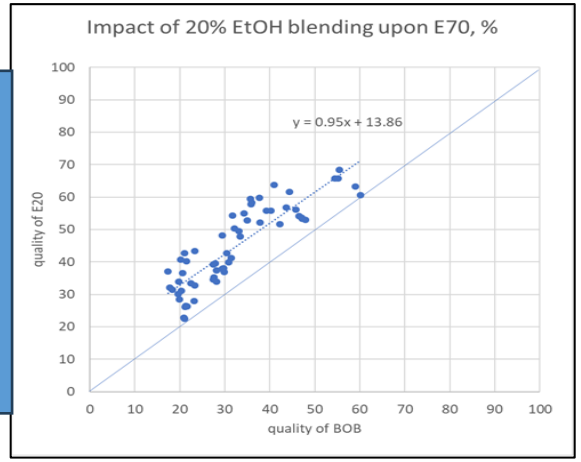
- Appropriate volatility of petrol is critical to the operation of spark-ignition engines with respect to both performance and emissions.
- Unlike ethers, ethanol changes the distillation characteristics of the petrol/ethanol mixture with the evaporated fraction at 70 °C (E70) impacted most significantly
- E70, E100 and E150 limits were set for the E20 TS appropriate to the impact of ethanol on distillation along with consideration of likely impacts on vehicle operation.

Property	Units	EN 228 E10		E20 TS	
% evaporated at 70°C E70 (Class A-B)	% (V/V)	20	50	20	68
% evaporated at 70°C E70 (Class C-F)	% (V/V)	22	52	22	68
% evaporated at 100°C E100	% (V/V)	46	72	46	75
% evaporated at 150°C E150	% (V/V)	75	-	80	-

Example impacts of E5-E25 on distillation profile (Concawe/Shell BEP525)



Impact of adding 20%V/V ethanol on the E70 of 60 base fuels (Concawe/Shell BEP525)



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Summary & next steps

- A CEN Task Force comprising relevant experts representing National Standardisation Bodies and liaison organisations has developed a Technical Specification for an ‘E20’ petrol, that was approved on Nov 7th 2025.
- The TS and supporting Technical Report are due to be published by the time of this conference (January 2026).
- The European Commission would have to amend the FQD to allow higher oxygenate levels (>E10) and thus legalise ‘E20’ for EU member countries.
- Clarity on fleet compatibility would then be required to ensure ‘E20’ could be deployed in impactful volumes.
- Such a fuel could provide a substantial opportunity to help decarbonise road transport in Europe.

Thank you for your attention

The authors thank the following contributors:

- CEN TC/19 WG21 E10+ Task Force members
- SGS for fuel field survey data