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A Roadmap for Test Methods and Requirements for future fuel in Europe

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EU Basics

- EU policies need technical definitions
- EC prefers CEN technical committees, offering best available fuels & application expertise to develop specification standards
- European standards complement e.g. the environmental laws, adding performance, safety and consumer protection

EU Basics

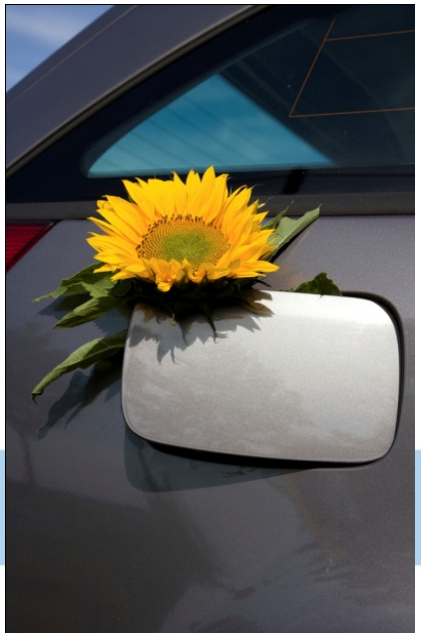
- Directive 98/70 (FQD) contains environmental & health related fuel quality specifications for petrol and diesel fuels in the EU
- sulfur, density, octane, PAH, etc.

EU Basics

- Amendment 2009/30 sets regular blend maxima at E10 (ethanol, with an E5 protection grade) and B7 (FAME, with possibilities for EU Member States to permit higher levels)
- Fuel suppliers to reduce life cycle greenhouse gas emissions per unit of energy from fuel and energy supplied by up to 10 % by 31 December 2020:
- 6% from biofuels in transport
- 2% in all modalities (incl. electric) and CCS
- 2% by buying credits
- Directive 2009/28 (RED) places a mandatory 10 % minimum target to be achieved by all Member States for the share of biofuels in transport petrol and diesel consumption by 2020, to be introduced in a cost-effective way

CEN/TC 19

- Responsible for liquid and gaseous fuels, lubricants and petroleum product standards in Europe; quality, sampling and test methods
- Since 1985 supporting FQD with standards on the basis of industry consensus
- Since 1998 working on biofuels



European motor fuels evolution

> 25 years of legislation & standardization created the present set of EU Directives and CEN specification standards, in support of:

- Improved air quality
- Open borders
- Security of supply
- Customer protection

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Biofuels mentioned in RED, Annex V

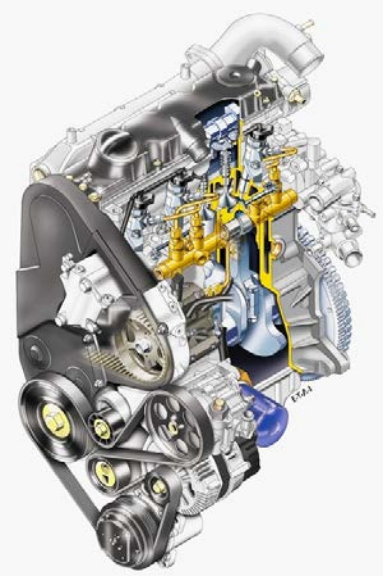
- pure vegetable oils
- biogas
- Fischer-Tropsch diesel (woody mass)
- hydro-treated vegetable oil
- ethers (ETBE, MTBE, TAEE)
- di-methyl ether (woody mass)

CEN organization for “new” fuels

- New Fuels Coordination Group reported every plenary meeting at minimum on short-, mid- and long-term needs
- Close collaboration with the EC on new topics and demands in order to prepare Mandates or others
- Experts in specification WGs present ideas
- Member States propose new work

Quality standards lead

- the engine doesn't see 1st or 2nd generation, but can be affected
- the injector doesn't know sustainability
- the filter is not EU-fuel origin specific
- the tank doesn't reckon smallholders
- the catalyst is ignorant of cellulose
- but the car has to fulfill emissions, attain low CO_2 and meet customer requirements



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And also ……

Despite the controversies (ILUC, sustainability, food vs. fuel) biofuels supply and demand are projected to grow

- Ethanol: 80% increase in worldwide demand 2009-2015
- Biodiesel: demand could triple between 2009-2015

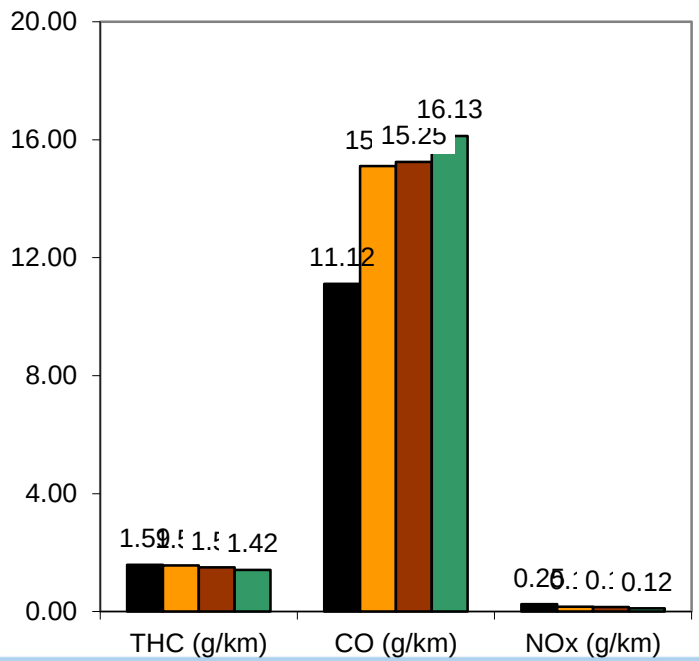
Higher blends (>10%) with adequate quality seem necessary to allow suppliers to fulfill EC targets

Some more history

When developing an E10 petrol specification, the refineries requested a volatility relaxation.

This led to an intensive literature and vehicle study in order to evaluate effects on vehicles

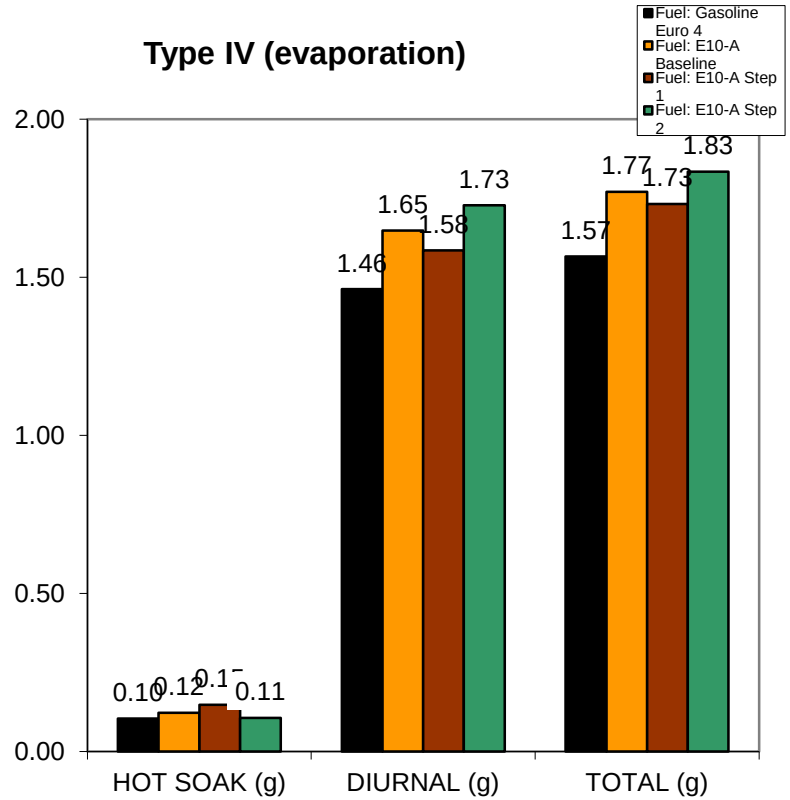
It delayed EN 228 revision.



Some more history

WG 38 was formed with the aim:

- To informally investigate a possible European standardization roadmap on future unleaded petrol
- Overview of and possible time plan for test methods and standard related fuel requirements



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WG 38 activity

- Assembled from all industries and various countries within CEN/TC 19
- Studying available public literature
- Worked between Dec 2011 and Sep 2012
- Draft report is balloted within CEN: prCEN/TR 16514

WG 38 activity

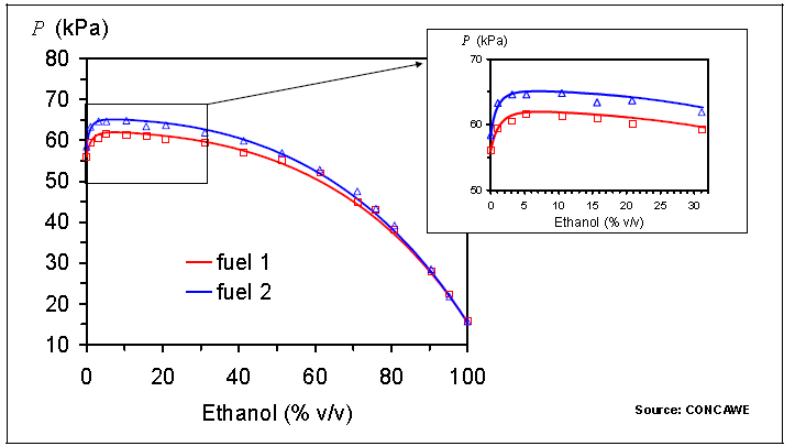
Focus on four elements:

1. External drivers; policies and market drivers and constraints
2. Engine and vehicle; constraints related to component compatibility, emission and fuel consumption (challenges and opportunities), plus consumer reliability, and the possibilities to overcome those
3. Refinery, blending and logistics; constraints related to crude feedstock, process control, blending capacity and fuel station capability, plus inherent safety, and anticipating those
4. Test methods; applicability of existing techniques and needs to verify such

Parameter		Current status of applicability	Verification (months)	Revision standard (years)
Sulfur	**UVF**	Check only	1	2 - 3
	WDXRF	Check only	2	2 - 3
	ICP-AES	Unknown	6 - 12	3
Manganese	**ICP**	Check only	5	1 - 2
	AAS	Check only	5	1 - 2
Lead		Check only	1	1 - 3
RON/MON		Applicable but to be checked	-	2 - 3
Density		Applicable	-	3
Oxidation stability				
	ISO 7536	Applicable	12 - 24	2 - 3
	ASTM D7525	Full assessment	12 - 24	2 - 3
Existent gum		Full assessment	12 - 24	2 - 3
Copper strip corrosion		Check only	6 - 12	1 - 3
Hydrocarbons	**FIA**	Full assessment	12 - 24	2 - 4
	Multi-GC	Check only	6 - 12	1 - 2
Oxygenates	**Multi-GC**	Check only	6	1 - 3
	GC	Full assessment	12	2 - 3
	O-FID	Check only	6	1 – 2
Benzene	**Multi-GC**	Applicable	-	-
	GC	Check only	6	1 - 2
	IR	Check only	6	1 - 2
Vapour pressure	**DVPE**	Check only	2	1 - 2
	triple expansion	Full assessment	12	2 - 3
Distillation		Full assessment	12	2 - 4
Sampling		Applicable	-	-

WG 38 conclusions

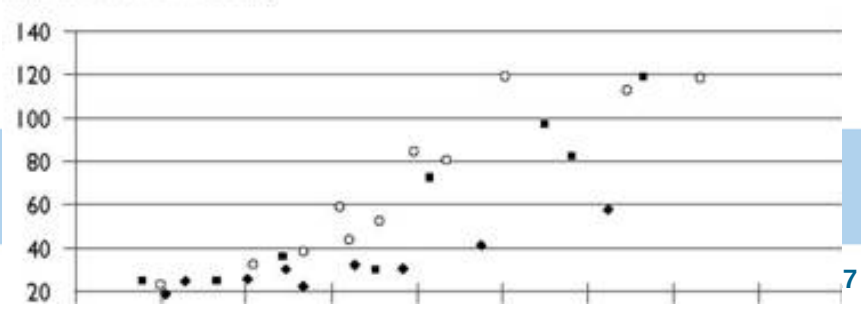
- Overview and possible roadmap for development of test methods and standard-related fuel requirements for an unleaded petrol containing oxygenate levels higher than currently allowed in the Fuel Quality Directive
- Although E10+ focussed, its conclusions can be copied to B7+ or other fuels intended to be sold at public fuelling stations



WG 38 conclusions

Before any new fuel specification can be developed in to a policy initiative from EU legislators, consider:

1) Need for more research to define preferred and achievable specifications for possible future biofuel blends
2) Need for adequate time to implement vehicle and fuel options, after any new fuel legislation and standard have been defined
3) Market introduction scenarios of the fuel supply and automotive industry, which may follow the general steps:
   a) introduction of capable cars,
   b) build infrastructure for the availability of the fuels, and
   c) introduce optimized vehicles
4) Need for funding to begin the necessary laboratory and vehicle testing



WG 38 conclusions

- Optimized vehicles or new designs may present benefits in regulated emissions, but due to increasingly stringent vehicle emission and CO_2 regulations the impact of increased biofuel (oxygen) content on regulated pollutants, CO_2, vehicle driveability and ignition behaviour must be studied in depth
- The manufacture, distribution and sale of fuel containing higher biofuel levels pose certain constraints and opportunities which must also be considered
- To facilitate any eventual marketing, new regulatory requirements should be agreed
- Each fuel property has to be measurable by robust test methods which have been verified to produce statistically relevant results at the expected levels

Possible roadmap for future fuels

a. Standardization mandate from EC to CEN is the trigger. Before mandate is issued the EU fuel legislation needs to be agreed.
b. Draft complete quality specification standard, oil industry can prepare infrastructure and automotive industry can start developing “capable” & compliant vehicles;
c. Finalization of CEN standard and preparation of fuel distribution infrastructure and “capable” vehicles in parallel;
d. Once mechanisms for new fuel introduction as a mainstream fuel have been introduced, “capable” vehicles may be introduced in order get some potential vehicles on the road, as the fuels distribution infrastructure is developing;
e. Once new fuel distribution infrastructure is almost fully established, “optimized” vehicles can be launched.

Introduction scenario

This is a scenario which may take 12 years from the actual point that legal matters have been settled and a Mandate is in place in order to get to the final point.

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Thank you for the attention

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