

MODERN MARKET TRENDS AND UPDATES OF MANNOL PRODUCTS

Automotive manufacturers and engine oil manufacturers objectives.
Overview of oil market trends for passenger cars and trucks.
Brief representation of changes in ACEA 2010.
Overview of main Mannol engine oils for passenger cars and trucks.
Overview of transmission oils.
Other products.



REASONS OF CONSTANT IMPROVEMENTS IN ENGINES AND LUBRICANTS BY MANUFACTURERS

Enviromental protection:

Legislation on emissions requires the introduction of new engine models wit low emission.
Increasing use of alternative fuels.

Cost of ownership:

Competition and the desire to reduce the cost and increase duration.

Globalization:

Standardization of requirements on a global scale.
The minimum standard that specifies requirements for quality.

Lack of natural resources:

Increase in cost of raw materials.
The trend to advanced conservation and reuse.

Tightening the rules of import and production of chemicals:

Increasing cost of product registration.

LUBRICANTS TODAY AND IN A FUTURE

European oil market is on the threshold of major changes.
There is a clear tendency for oils with a much lower viscosity.
This trend will drive the growth in demand for high-quality base oils.
Optimized LOW SAPS additives should be a balance sheet of fuel economy and required engine protection.
The European oil industry is more inclined to comply with the requirements of engine manufacturers.

The requirements priority:

OEM specifications • ACEA specifications • API and other specifications



FILTRATION SYSTEM AND CATALYSTS

Diesel particulate filter (DPF):

The filter consists of a ceramic liner resembling the structure of the honey layer which has a micro tube on which stops particles.

Filter regenerable and do not require periodic maintenance and cleaning.

Principle of the DPF filter:

Collected on the filter surface particulate matter (soot) and gradually increase.

After exceeding the critical mass they self combust.

Three way catalysts (TWC):

Three functions of TWC:

Reducing-limiting Emission Nox.

Oxidation-limitation of unburned hydrocarbons and carbon monoxide.

Control-Control of the engine by controlling the amount of oxygen in the exhaust gases- adjustment ratio of fuel/air.

Trucks and buses:

Exhaust gas recirculation. (EGR)

Diesel particulate filters. (DPF)

Selective catalytic reduction. (SCR)

Self-renewing particulate filter. (CRT)

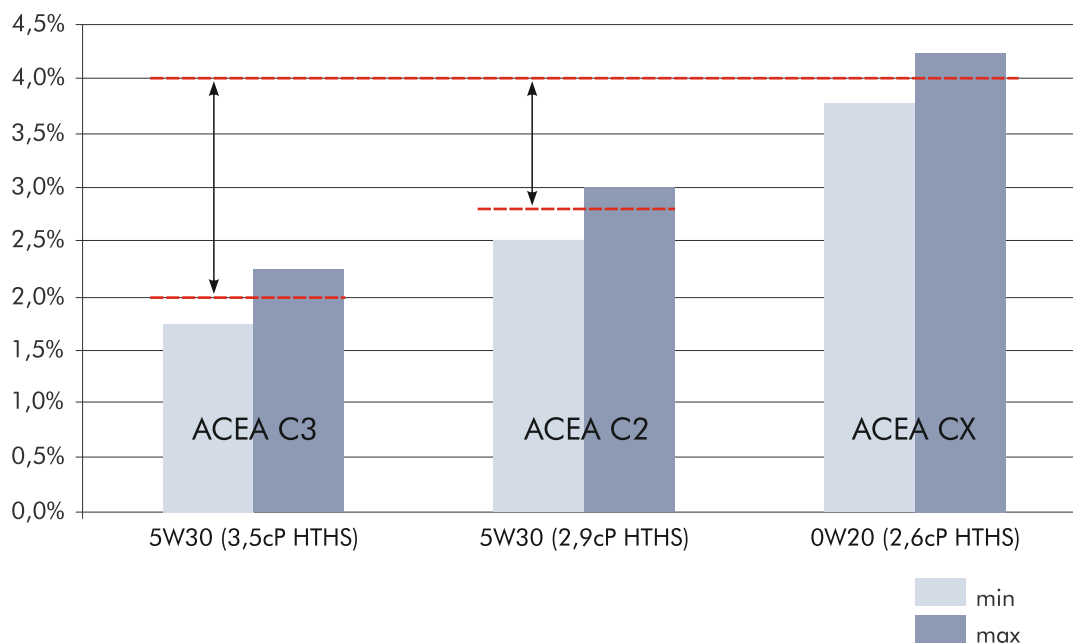
LUBRICANT MANUFACTURERS TARGETS:

EMISSION

DURABILITY

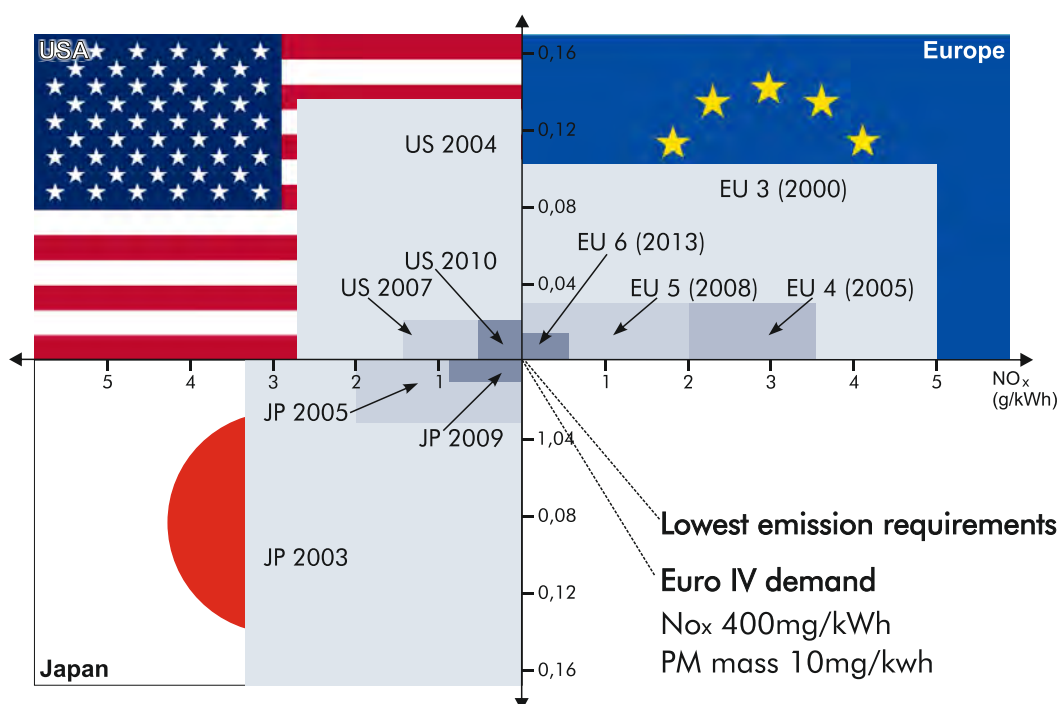
FUEL ECONOMY

THE INCREASE IN FUEL ECONOMY DUE TO VISCOSITY



EURO IV DEMAND FOR EMISSIONS ON THE ROAD

Demand for emissions worldwide...





THE ELEMENTS AFFECTING THE ADVANCEMENT ISSUE IN OILS

Ash formed from engine oil can cause blockage of the filters DPF and CRT.

Consequences:

Increased pressure in exhaust duct.

Increased fuel consumption.

Phosphorus from the engine oil may cause failure of the catalyst which will increase the Emission.

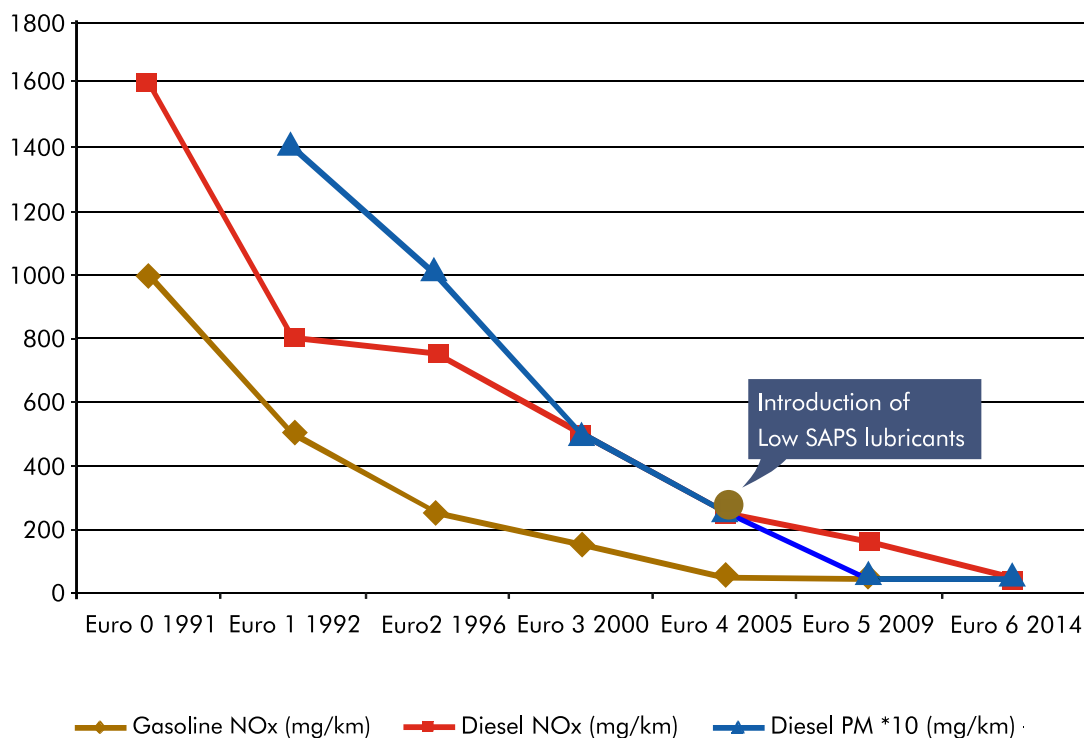
Sulfur from oil can cause a blockage of NO_x filters and slow down catalytic reduction processes.

	SA	P	S
	Sulphated Ash	Phosphorus	Sulphur
Low	0,5	0,05	0,2
Average	0,8	0,08	0,2
Standard	≥1,2	≥0,1	≥0,5
Reduction	60%	50%	40%

NEW GENERATION – LOW SAPS

Element	Engine Oils with high SAPS solve the problem of	Engine oils with low SAPS need new solutions
Sulphated Ash	Dispersion systems and anti-wear systems	New approaches to achieve the requirements of the piston cleanliness
Phosphorus	Anti-wear systems and antioxidant systems	New approaches for achieving protection against wear and maintain the oxidation resistance
Sulphur	Dispersion systems, anti-wear systems, Base oils (API group I and II).	New technology for reducing or removing sulfur from anti-wear systems, detergents, and antioxidants. Increased use of low sulfur base oils.

CHANGE IN EMISSION REQUIREMENTS



CHANGES IN ACEA 2010

ACEA 2008 issued in December 2008, has expired and now mandatory requirements are ACEA 2010.

ACEA 2010 issued in December 2010, became mandatory from December 2012.

In Dec. 2010 for the first time allowed to declare compliance to ACEA 2010.

In Dec. 2012 ACEA requirements for all formulations of oil must meet ACEA 2010, all recipes accordingly re-tested.

	A1B1-08	A1B1-10	A3B3-08	A3B3-10	A3B4-08	A3B4-10	A5B5-08	A5B5-10
Sulphated Ash %	1,3 max	1,3 max	1,5 max	0,9-1,5	1,6 max	1,0-1,6	1,6 max	1,6 max
TBN	8 min	8 min	8 min	8 min	8 min	10 min	8 min	8 min
TBN	4 min	4 min	4 min	4 min	4 min	6 min	4 min	4 min

	C1 08	C1 10	C2 08	C2 10*	C3 08	C3 10	C4 08	C4 10
Sulphated Ash %	0,5 max	0,5 max	0,8 max	0,8 max	0,8 max	0,8 min	0,5 min	0,5 min
TBN					6 min	6 min	6 min	6 min
TBN	declare	declare	declare	declare	declare	declare	declare	declare

SYNTHETIC OILS SAE 5W30

	O.E.M for Hyundai, KIA	O.E.M for Peugeot, Citroen	O.E.M for Chevrolet, Opel	Energy Formula JP	Energy Combi LL	Diesel TDI	Energy Formula FR	Energy Formula OP
SAE	5W30	5W30	5W30	5W30	5W30	5W30	5W30	5W30
API	SN/SM/CF	SN/SM/CF	SN/SM/CF	SN	SN/SM/CF	SN/SM/CF	SL/CF	SL/CF
ACEA A/B	A3	A5/B5						A3/B4
ACEA C		C2	C2/C3		C3	C3		
PSA Peugeot Citroen B712290		•				•		
MB 229,3								•
MB 229,51					•	•		
VW 504 00/507 00					• approved			
VW 502 00/505 00					•			•
VW 502 00/505 01					•	• approved		
Ford WSS-M2C913A/913B							•	
BMW Longlife-04					•			
Opel LL-A-025 /B-025								•
GM dexos 1				•				
GM dexos 2			•			•		
IISAC GF -3							•	
IISAC GF-5/GF-4/GF-3	•			•				

SYNTHETIC OILS SAE 5W40

ELITE



Mannol Elite is a modern engine oil of the latest generation, for the lubrication of all 4-stroke gasoline and diesel engines with or without turbo. Provides easy cold cranking and extreme cleanness of the engine components. Has optimal viscosity at wide-ranging temperatures. Thanks to its high thermal-oxidative stability prolongs the periods between oil changes.

O.E.M. for Daewoo GM



Synthetic engine oil specially designed to use in modern petrol and diesel engines for DAEWOO, UZ-DAEWOO and GM. Effectively protects against wear and provide an exceptional clarity of details. Designed to meet the requirements for operations in hard conditions and long maintenance intervals.

	ELITE	O.E.M. for Daewoo GM
SAE	5W 40	5W 40
API	SN/SM/CF	SN/SM/CF
ACEA A/B	A3/B4	A3/B4
MB 229,3	•	
MB 226.5 (v2012.2)	•	
MB 229.5		•
VW 502 00/505 00	•	•
Opel LL-B-025	•	
Renault RN 0710	•	•
Renault RN 0700	•	•
Porsche A40	•	
JASO MA-2 (2011)	•	

MINERAL AND SEMI-SYNTHETIC OILS FOR DIESEL TRUCKS

	API	ACEA	MB 228,1	MB 228,3	MB 229,1	MAN 271	MAN 3275	Volvo VDS	Volvo VDS2	Volvo VDS3	Mack EO-N	Cummins CES 20074	Cummins CES 20078	Caterpillar ECF-1a	Renault VI RLD-2	Detroit Diesel PGOS 93K216	Detroit Diesel 93K215	Deutz DQC-III-05	Global DHD-1
TS-1 15W40	CH-4/SL	E3/A3/B3	•	•			•		•										
TS-2 20W50	CH-4/SL	E3/A3/B3	•		•	•		•											
TS-3 10W40	CH-4/SL	E3/A3/B3	•	•			•		•										
TS-4 Extra 15W40	CI-4/SL	E7/A3/B4	•	•			•		•	•	•		•		•		•	•	•
TS-5 10W40	CI-4/SL	E7/A3/B4	•	•			•		•	•	•		•		•		•	•	•
TS-11 GEO 15W40												•				•			
TS-9 NANO	CI-4/SL	E7/A3/B4	•	•						•									

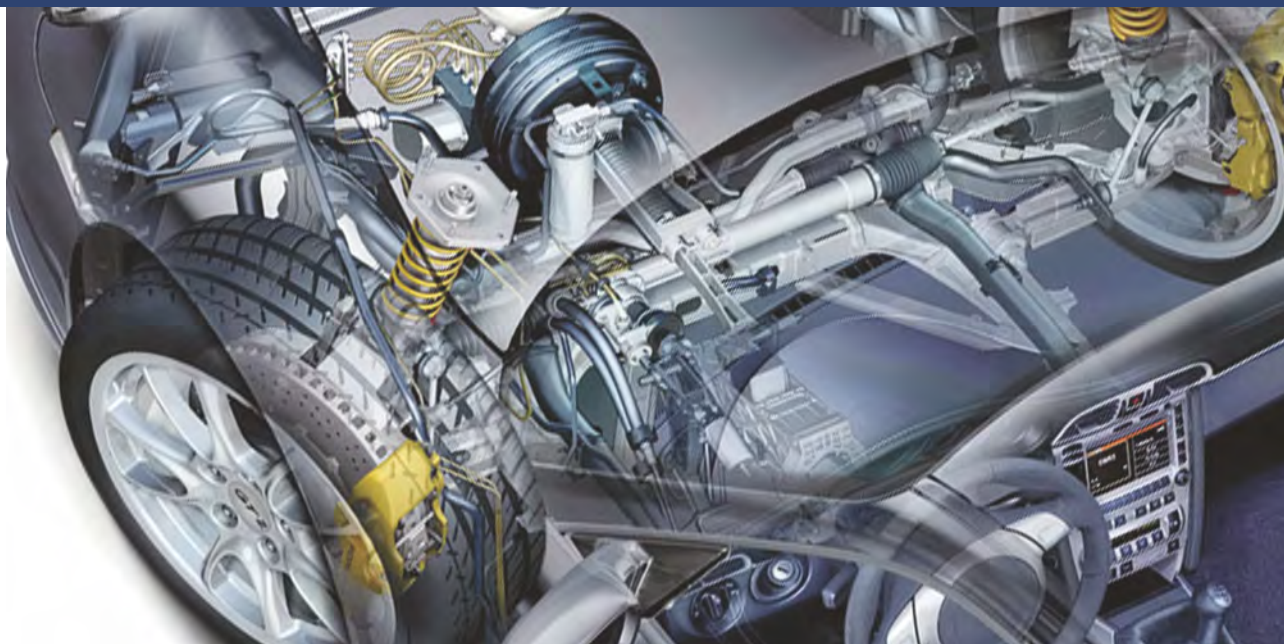


OILS FOR NEW GENERATION TRUCKS

TS 6 UHPD 10W40 Eco	TS-7 UHPD 10W40 Blue	TS-8 UHPD 5W30 Super
API CI-4	API CJ-4	ACEA E4
ACEA E4/E7	ACEA E4/E6/E7/E9	MB 228.5
MB-Approval 228.5	MB-Approval 228.51	MAN 3277
MAN 3277	MB 228.31	Vovo VDS -3
Volvo VDS -3	MAN M 3477	MTU 3
Renault VI RLD-2	MAN M3575/ M3275-1	
MTU 3	MTU 3.1	
Deutz IV-10	Volvo VDS-4	
Mack EO-N	Catterpillar ECF-3	
Mack EO-M+	Cummins CES 20081	
Cummins 20078	Mack EO-O Premium plus/EO-N	
Global DHD-1	Mack EO-N	
Detroit Diesel 93K215	Renault VI RLD-3	
	Renault VI RLD-2	
	Deutz DQC IV-10 LA / DQC-III-10 LA	
	Detroit Diesel 93K218	

SEMI-SYNTHETIC OILS FOR PASSENGER CARS

	Classic	Stahlsynth Energy	Nano Technology	Diesel Extra	Molibden Benzin	Molibden Diesel	Defender	Gasoil Extra	Special
SAE	10W40	5W30	10W40	10W40	10W40	10W40	10W40	10W40	10W40
API	SN/SM/CF	SL/CF	SM/CF	CH-4/SL	SL/CF	CG-4/SJ	SL/CF	SL/CF	SG/CD
ACEA A/B	A3/B4	A3/B3	A3/B4	A3/B3	A3/B3	E2/B3/A2	A3/B3	A3/B3	
MB 229,1	•	•					•	•	
MB 229,3			•						
VW 502 00/505 00	•		•						
VW 500 00/505 00		•		•					
VW 505 00/501 00							•	•	
Renault RN 0700	•								



AUTOMATIC TRANSMISSION FLUIDS

Manufacturers of gearboxes objectives:

Fuel economy and reduce CO2 emissions • Customer satisfaction, driving with comfort, reliability
Reduction of production costs and the costs for consumers • Increase of the oil change interval

AUTOMATIC TRANSMISSION OIL

ATF-A Automatic Fluid	GM ATF-A Suffix A; Allison C3;
ATF Dexron II Automatic	GM Dexron IID; MB 236.5/236.7; Allison C4; Cat -TO-2; Voith G607; MAN 339 V1/Z1; ZF TE-ML 03D/04D/11A/14A/17C
ATF Dexron III Automatic Plus	Dexron IIH/G/F; Ford Mercon V; Allison C-4; Allison TES 389; Caterpillars TO-2; M2C138-CJ; M2C166-H; MB 236.1; ZF TE-ML 09/11/14; Voith G607; Power steering fluid
Dexron VI	GM Dexron VI; Ford Mercon LV; Toyota Type WS; Hyundai SP-IV; Nissan Matic S; Allison C-4; Chrysler ATF+4; Shell M-1375.4; JASO 1A
Type IV Automatic Special	Toyota Type T-IV
SP-III Automatic Special	Hyundai ATF SP-III; Mitsubishi ATF SP3; KIA ATF-SP-III
ATF AG-52 Automatic Special	VW TL 52 162; MB 236.11; Jaguar JLM 202 38; Porsche 999.917.547.00; BMW 832 29 407 807
ATF AG 55	Audi/VW G 055 005 A1/A2/A6;
ATF-WS Automatic Special	Toyota T-III/T-IV/WS Lifetime, Aisin Warner; Chrysler ATF +3/4; 4 and 5 speed European (BMW, MB, VW); Voith ATs 55.6335; MAN 339 Type Z1



MECHINICAL TRANSMISSION OIL

Mineral	Universal Getriebeoel 80W90	API GL-4 ; AGMA 252.04; ISO 12925-1 CKC; ISO 6743-6 CKC; US Stell 224; DIN 51517 Part III
	Hypoid Getriebeoel 80W90	API GL-5 ; LS; Ford WSD-M2C200-C; SAE J2360
	Hypoid LSD 85W140	API GL-5;MT1; SAE J2360
Synthetic	FWD Getriebeoel 75W85	API GL-4; MT1
	Extra Getriebeoel 75W90	API GL-5; LS; Mack GO-J; Ford WSD-M2C200-C
	Synpower 4*4 75W140	API GL-5 LS; Mack GO-J; Mack GO-J plus; Scania STO 1:0
	Basic Plus Getriebeoel 75W90	API GL-4+; VW 501 50

SCT LUBRICANTS PRODUCE AS WELL:

Marine oil • Oil for gas engines • Oil for two-stroke air-cooled engines
 Oil for two-stroke water-cooled engines • Oil for four-stroke engines
 Hydraulic oil • Compressor oil • Universal tractor oils STOU & UTTO

Other products:

Auto shampoos for contactless washing and other cleaning products for industrial premises
 Antifreezes