

中国汽车燃油经济性标准 China Automotive Fuel Economic Standards

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背景 (Background)

- ❖ 我国石油资源和产量有限 (长期徘徊在1.6亿吨/年)
Limited oil resource and production (fluctuating around 160 million tons per year)
- ❖ 1993年起成为石油净进口国
From 1993, China has become a net oil importer
- ❖ 2000年原油进口>6千万吨, 2003年>9千万吨, 2005年预计超过1亿吨
Oil imported amount of > 60 million tons in 2000, > 90 million tons in 2003, and will be more than 100 million tons in 2005
- ❖ 2000年汽车消耗燃料5 ~ 6千万吨
Automobiles consumed fuel 50 ~ 60 million tons in 2000

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背景 (Background)

- ❖ 如不加以控制, 将严重影响中国的能源安全性
if uncontrolled, Chinese energy security will be influenced terribly
- ❖ 将彻底扰乱世界石油的供应格局
World oil supply and demand situation will be fully disturbed
- ❖ 2002年前汽车保有量以每年将近15%的速度增长, 但2002和2003超过30%
Before 2002, auto population increased with an average rate of 15%/year, but more than 30% in 2002 and 2003
- ❖ 轿车进入家庭的高潮开始
The climax of family cars begins
- ❖ 控制燃油耗也能降低温室气体CO₂的排放
Controlling the fuel consumption, the green house gas CO₂ will be decreased as well

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燃油经济性标准 Fuel Economic Standards

- ❖ 燃油经济性标准包括:
Fuel Economic Standards content:
 - ❖ 轻型汽车燃料消耗量试验方法
Measurement Method of Fuel Consumption for Light-Duty Vehicles
 - ❖ 乘用车燃料消耗量限值
Limits of Fuel Consumption for Passenger Cars

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轻型汽车燃料消耗量试验方法 GB/T 19233-2003

Measurement Methods of Fuel Consumption for Light-Duty Vehicles

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GB/T 19233-2003

- 参照采用1997年1月1日实施的ECE R101全部技术内容
Refer to all the technical matters of ECE R101 brought into force on Jan. 1st, 1997
- 适用于M₁、≤3.5t的N₁和M₂类汽、柴油车
Applying to the gasoline and diesel vehicles in the category of M₁, N₁ and M₂ of ≤3.5t
- 此标准于2003年12月1日起实施
This standard is applied on Dec. 1st, 2003

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GB/T 19233-2003

- 测量对象主要是**燃油耗**也包括CO₂
Fuel consumptions are the mainly measuring objects, including the CO₂ as well
- 结合排放试验进行
Combining with the emission test
- 可以在测量排放的同时用碳平衡法计算得到**燃油耗**
Fuel consumptions may be calculated by carbon balance method simultaneously with the emission test

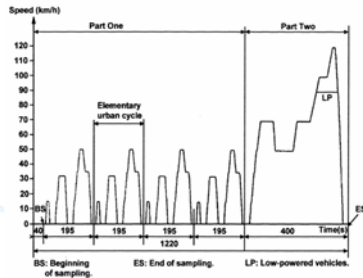
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GB/T 19233-2003 运转循环 (operating cycle)

- 与我国当前实施的排放标准(相当于欧I和欧II)的运转循环一致
The operating cycle is the same as that as for the emission standard (corresponding EU I and EU II) applied now in China

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GB/T 19233-2003 运转循环 (operating cycle)



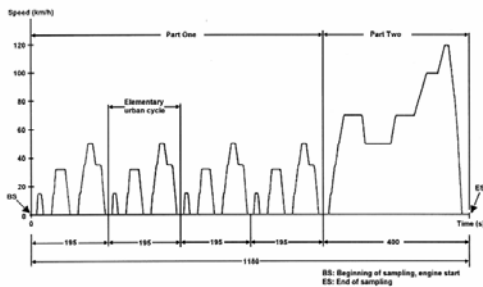
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GB/T 19233-2003 运转循环 (operating cycle)

- 2007年7月1日后由于实施第III阶段(欧III)的排放标准运转循环将改变
May be changed after July 1st, 2007 due to applying the III stage (EU III) emission standard
- 但两种运转循环测得值的差别只有0.7%-1.1%
The difference of the measured fuel consumptions between two operating cycle is only 0.7%-1.1%

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GB/T 19233-2003 2007年7月1日后的运转循环 operating cycle after July 1st, 2007



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GB/T 19233-2003 基准燃料 (Reference fuel)

- 试验时需使用基准燃料, 其氢-碳比, 汽油为1.85柴油为1.86
During test, reference fuels shall be used, the H-C ratios of which are 1.85 for gasoline and 1.86 for diesel
- 但中国目前无法获得
However, it will not be available in China now
- 如果使用燃料的氢-碳比偏差±10%, 对燃油耗计算结果的影响分别为+1.4%和-1.3%
If there are a ±10% difference to the H-C ratio of the fuel used, the fuel consumption results calculated will be warped +1.4% and -1.3% respectively

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GB/T 19233-2003

车辆行驶阻力 Vehicle Driving Resistance

- 应采用道路测量方法确定车辆的行驶阻力
Measurement method on the road should be taken to establish the vehicle driving resistance
- 此方法可以反映车辆的风阻、轮胎的阻力等，这对测量油耗非常重要
The wind resistance, the tyre resistance, etc. may be reflected by this method, which are very important in measuring fuel consumption

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GB/T 19233-2003

- 2003年1月31日实施的ECE R101包括了气体燃料
The ECE R101 brought into force on Jan. 1st, 2003 includes the gas fuels
- GB/T 19233-2003不包括气体燃料
GB/T 19233-2003 excludes the gas fuels
- 这样简化了第一次实施燃油消耗标准
It will be simplified to implement the fuel consumption standard at its first time realization

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乘用车燃料消耗量限值 (GB 19578-2004)

Limits of Fuel Consumption for Passenger Cars

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乘用车燃料消耗量限值 Limits of Fuel Consumption for Passenger Cars

- 试验方法采用GB/T 10233-2003
GB/T 19233-2003 will be applied as the test method
- 适用于M₁类柴油车和汽油车
Applying to the gasoline and diesel fueled vehicles of category M₁
- 限值根据中国实际情况确定
The limits are determined according to the Chinese facts
- 汽油车和柴油车采用同一限值
Limits are the same for both gasoline and diesel fueled vehicles

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限值目标 (Target of the Limits)

- 限值分两阶段
There are two limit stages
- 第一阶段比现有乘用车油耗降低**5%~10%**
第二阶段比现有乘用车油耗降低**15%左右**
The first stage reduces the fuel consumption 5%~10%, and the second stage reduces the fuel consumption ≈15%, comparing to the cars in existence
- 这是“十·五”和“十一·五”规划的目标
These are the targets in the tenth and eleventh five year plans

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限值的表示方式 Denotation Method of the Limits

- 目前有两种表示限值的方式
Now, there are two methods to denote the limits
- 第一种是美国的‘公司平均燃料经济性’ (CAFE)
The first is the ‘Corporate Average Fuel Economy’ (CAFE) in US
- 第二种是日本的‘质量分等+小CAFE’
The second is the ‘Classified by Mass +Part-CAFE) in Japan

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美国的公司平均燃料经济性 CAFE in US

- CAFE是以某公司的各种车型经销售量加权后的平均燃油耗进行评价
CAFE evaluates the average fuel consumption of different type of vehicles weighted by sale amount within a company
- 它只有一个限值
It has only one limit
- 公司可以自由生产高、低燃油消耗的车辆
Company can freely produce vehicles with high and low fuel consumption
- 政府可以控制汽车消耗的燃料总量
Government can control the gross amount of the fuel consumed by vehicles
- 公司必须生产足够多的汽车品种
Company must produce sufficient type of vehicles

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日本的质量分等+小CAFE Classified by mass + part CAFE

- 汽车质量对燃油耗有决定性影响
Vehicle's mass definitively affects the fuel consumption
- 日本将汽车质量分为9等
Vehicles are classified into 9 classes in Japan
- 各质量组内的汽车按CAFE方式平均后进行评价
Vehicles within a class are averaged by the CAFE method and evaluated
- 各质量组都需提高燃料经济性
All the mass classes need to improve their fuel economy
- 能体现政府对不同质量汽车的倾向
Government can guide the vehicles of different masses which he prefers to develop

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中国限值的表示方式 Denotation Method in China

- 中国每个汽车制造厂只生产少量车型
In China, only few vehicle types are produced in a company
- 采用质量分等比较合适
Mass classifying method is suitable
- 即使在质量组内也没有条件采用CAFE
Even in a mass class, CAFE is not adopted, due to the external conditions
- 参照排放标准对基准质量分等方法，整备质量分为16段，这对汽车制造厂有利
Referring to the reference mass classification of the emission standard, the curb mass is divided into 16 classes. This will be favorable to the manufacturers

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限值的确定 Establishment of the Limits

- 以2002年前国产乘用车油耗水平为基础
Based on the fuel consumption level of the passenger cars locally produced before 2002
- 充分考虑主要制造厂的意见
The opinions of the main manufacturers have been taken into account adequately
- 第一阶段的限值相当于2002年前平均水平，符合率约为50%
The first stage limits correspond to the average level before 2002, satisfied rate is about 50%
- 第二阶段的限值比第一阶段加严10%，符合率约为16%
The second stage limits are 10% tighter than the first stage, satisfied rate is about 16%

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实施日期 Dates of Implement

- 此标准已于2004年9月2日发布
This standard was issued on Sept. 2nd, 2004
- 对于新生产车，第一阶段2005年7月1日实施，第二阶段2008年1月1日实施
For vehicles newly put into production, will be met the first stage on July 1st, 2005, and met the second stage on Jan. 1st, 2008
- 在生产车推迟一年实施
Vehicles newly put into production before those days will be postponed to implement for one year

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一般乘用车的限值
Limits of Normal PC Unit: L/100km

整备质量 (Curb Mass) (CM), kg	第一阶段 First Stage	第二阶段 Second Stage
CM≤750	7.2	6.2
750 < CM ≤ 865	7.2	6.5
865 < CM ≤ 980	7.7	7.0
980 < CM ≤ 1090	8.3	7.5
1090 < CM ≤ 1205	8.9	8.1
1205 < CM ≤ 1320	9.5	8.6
1320 < CM ≤ 1430	10.1	9.2
1430 < CM ≤ 1540	10.7	9.7
1540 < CM ≤ 1660	11.3	10.2
1660 < CM ≤ 1770	11.9	10.7
1770 < CM ≤ 1880	12.4	11.1
1880 < CM ≤ 2000	12.8	11.5
2000 < CM ≤ 2110	13.2	11.9
2110 < CM ≤ 2280	13.7	12.3
2280 < CM ≤ 2510	14.6	13.1
2510 < CM	15.5	13.9

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特殊结构乘用车的限值

Limits for PC with special configurations

- 对于具有下列结构的汽车，限值放宽**6%**
For PC with following configurations, there are **6% relax** for their limits
 - 装自动变速器 with auto-transmission
 - 具有≥三排座椅 with ≥3 lines of seats
 - 属MG₁类汽车 in the category of MG₁
- 具备不止一种以上结构，限值只放宽**6%**，不叠加
Vehicles with more than one above configuration, the limit is relaxed only **6%**, not to be piled up

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特殊结构乘用车的限值

Limits of PC with Special Configuration Unit: L/100km

整备质量 (Curb Mass) (CM), kg	第一阶段 First Stage	第二阶段 Second Stage
CM≤750	7.6	6.6
750 < CM ≤ 865	7.6	6.9
865 < CM ≤ 980	8.2	7.4
980 < CM ≤ 1090	8.8	8.0
1090 < CM ≤ 1205	9.4	8.6
1205 < CM ≤ 1320	10.1	9.1
1320 < CM ≤ 1430	10.7	9.8
1430 < CM ≤ 1540	11.3	10.3
1540 < CM ≤ 1660	12.0	10.9
1660 < CM ≤ 1770	12.6	11.3
1770 < CM ≤ 1880	13.1	11.8
1880 < CM ≤ 2000	13.6	12.2
2000 < CM ≤ 2110	14.0	12.6
2110 < CM ≤ 2280	14.5	13.0
2280 < CM ≤ 2510	15.5	13.9
2510 < CM	16.4	14.7

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与世界水平的比较

Comparing with the Level over the World

- 统计资料来自**2002年“Ward's Automotive Yearbook”**
Statistical data are from the “Ward's Automotive Yearbook” 2002 edition
- 包括世界各国**32个**厂家，**506种**轿车车型
Including **32 manufacturers** of different countries in the world, statistical amount are **506 types** of PC
- 以每种车型的‘整备质量’和‘城市/公路估算燃油耗’进行统计
The statistical data are progressed by the ‘Curb Weight’ and ‘Estimated miles per gallon in City and Highway’ (Est. MPG City/Hwy) of each vehicle type

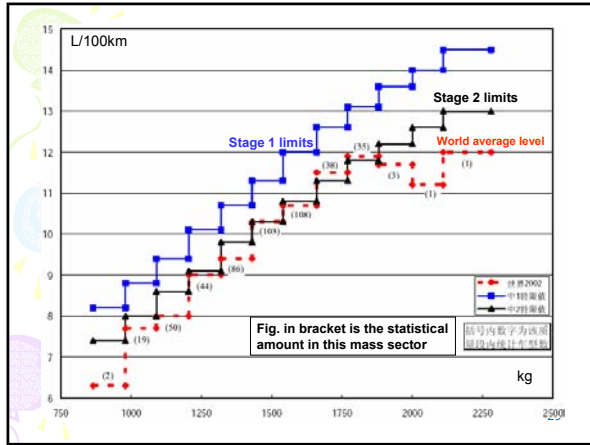
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与世界水平的比较

Comparing with the Level over the World

- 统计结果表明，第二阶段限值与**2002年**世界各国轿车的平均油耗水平相当
The statistical results show that the limits of the second stage are corresponded with the PC average level of the world in 2002
- 要求**2008年**新开发的乘用车达到**2002年**世界轿车平均水平
That is to say that the newly developed PC in 2008 should reach the PC average level of the world in 2002

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关于SUV With Regard to SUV

- 美国SUV属轻型货车，同时燃油价格低：
In US, SUV is in the category of light truck, while the fuels price are relatively low:
 - SUV销售率从1990的6%猛增至2002年的接近25%
Sale rate increased from 6% in 1990 to 25% in 2002
 - 美国能源部认为是法规的缺陷
US Energy Department considers that it's the disfigurement of their regulation

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关于SUV With Regard to SUV

- 日本油耗法规顾及SUV，欧洲没有强制性法规，但欧洲和日本的燃油价格约为美国的3倍：
Fuel consumption regulation in Japan has considered SUV, and in Europe, there has no compulsive regulations for fuel consumption, while the fuels price in Europe and Japan are about 3 times of that in US:
 - 2002年SUV销售率不足5%
Sale rates are less than 5% in 2002

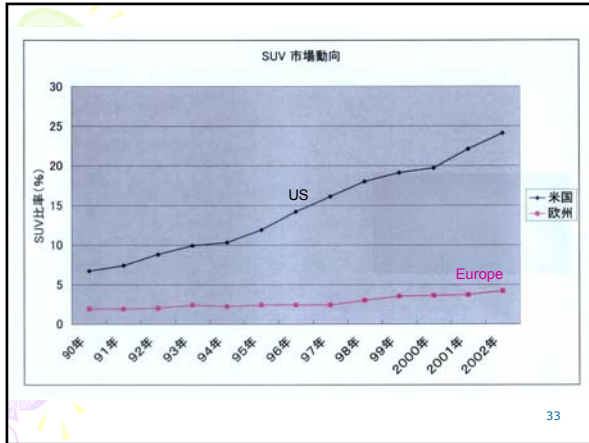
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世界燃油价格——2004年8月
World Fuel Prices——August 2004

国家 Country	英便士/升 UK pence per litre		人民币元/升 RMB per liter	
	无铅汽油 Unleaded	柴油 Diesel	无铅汽油 Unleaded	柴油 Diesel
丹麦 Denmark	82.56	71.55	12.23(2.95)	10.60(2.56)
法国 France	73.12	60.25	10.83(2.62)	8.93(2.16)
德国 Germany	80.56	64.32	11.94(2.88)	9.53(2.30)
荷兰 Netherlands	85.98	62.96	12.74(3.08)	9.33(2.25)
意大利 Italy	78.53	64.32	11.64(2.81)	9.53(2.30)
挪威 Norway	80.96	70.47	12.00(2.90)	10.44(2.52)
瑞典 Sweden	76.67	66.99	11.36(2.74)	9.93(2.40)
美国 USA	27.91	27.91	4.14(1)	4.14(1)
中国 China			3.74(0.90)	3.52(0.85)

括号内数字是与美国油价相比的倍数
Figures in parentheses are the multiple of the price comparing to that of the US

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对SUV的限制 Restrict of SUV

- 中国的燃油价格比美国还低
The fuels price in China is even lower than that in US
- 2002年进口轿车中将近一半是SUV
Half of PC imported in 2002 are SUV
- SUV的燃油耗非常高，应该加以限制
Fuel consumption of SUV is very high, it shall be restricted
- 应该开发先进技术的SUV，世界上有先例
Advanced SUV shall be developed, there are precedents over the world

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2002年世界SUV平均水平与本标准限值的比较
Compare the average level of the SUV in the world in 2002 with the first stage limits of this standard

整备质量 (Curb Mass) (CM), kg	被统计车型数 Statistic Type Num.	符合第一阶段限值车型数 Type Num. Satisfied the First Stage Limits	符合率 Satisfied Rate
1205 < CM ≤ 1320	2	1	50%
1320 < CM ≤ 1430	7	2	29%
1430 < CM ≤ 1540	6	3	50%
1540 < CM ≤ 1660	11	4	36%
1660 < CM ≤ 1770	36	10	28%
1770 < CM ≤ 1880	27	12	44%
1880 < CM ≤ 2000	33	9	27%
2000 < CM ≤ 2110	26	14	54%
2110 < CM ≤ 2280	20	8	40%
2280 < CM ≤ 2510	24	14	58%
2510 < CM	3	0	0%
总计	195	77	40%

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谢谢!
Thanks!

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美国轻型货车的限值

- 2004----20.7mpg 13.21 L/100km
- 2005----21.2mpg 12.90 L/100km
- 2006----21.7mpg 12.60 L/100km
- 2007----22.2mpg 12.32 L/100km

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G类车辆

- 至少有一个前轴和至少有一个后轴能够同时驱动，其中包括一个驱动轴可以脱开的车辆
- 至少有一个差速锁止机构或至少有一个具有类似作用的机构
- 单车计算爬坡坡度至少为**30%**
- 必须满足下列六项要求中的至少五项：
 - 接近角 $\geq 25^\circ$ --离去角 $\geq 25^\circ$
 - 纵向通过角 $\geq 25^\circ$ --前轴离地间隙 $\geq 250\text{mm}$
 - 后轴离地间隙 $\geq 250\text{mm}$
 - 前后轴间的离地间隙 $\geq 300\text{mm}$

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