1 Scope

This standard applies to unleaded gasoline composed of liquid hydrocarbons or liquid hydrocarbons enhanced by other blending components for motor vehicles.

The product specified hereunder are fuels of internal combustion engines equipped with spark ignition.

2 Referenced documents

The stipulations stated in the following standards constitute an essential part of this standard through reference. All the following standards are still valid except explicit specifications otherwise.

GB/T 256 Test method for induction period of gasoline
GB/T 259 Test method for acids & bases miscible in water in liquid petroleum product
GB/T 260 Test method for water in liquid petroleum product
GB/T 380 Test method for sulfur in liquid petroleum product (lamp method)
GB/T 503 Test method for Octane number of gasoline (motor method)
GB/T 509 Test method for gum content in motor fuels
GB/T 511 Test method for mechanical impurities in liquid petroleum product and additives
GB/T 1792 Test method for mercaptan in distillate fuels
GB/T 4756 Manual sampling method of liquid petroleum product
GB/T 5096 Test method for detection of copper corrosion from petroleum products by the copper strip tarnish test
GB/T 5487 Test method for Octane number (research method)
GB/T 6536 Test method for distillation for liquid petroleum product
GB/T 8017 Test method for vapor pressure for liquid petroleum product (Reid method)
GB/T 8018 Test method for oxidation stability for gasoline (induction period)
GB/T 8019 Test method for gum in motor gasoline and aviation fuels (air jet)
GB/T 8020 Test method for lead content in gasoline (atomic adsorption spectroscopy)
GB/T 11132 Test method for hydrocarbon types in liquid petroleum product
GB/T 17040 Test method for sulfur content in liquid petroleum product (Energy-Dispersive X-Ray Fluorescence Spectroscopy)
SH 0164 Rules for package, logistics and delivery of liquid petroleum product
SH/T 0174 Test method for mercaptan in aromatics and light petroleum product (Doctor test)
3 Designation of gasoline grades
Gasoline is divided into three grades according to the RON of gasoline: 90, 93 and 95

4 Definitions
The antiknock index is defined as the average of RON and MON

5 Specifications
Specifications are listed in table 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Requirement</th>
<th>Test methods</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>90</td>
<td>93</td>
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<tr>
<td>Antiknock property:</td>
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<td></td>
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<tr>
<td>RON min</td>
<td>90</td>
<td>93</td>
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<tr>
<td>Antiknock index min</td>
<td>85</td>
<td>88</td>
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<td>Lead content [1], g/L, max</td>
<td>0.005</td>
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<td>Distillation property:</td>
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<td>10% distillation, °C max</td>
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<td>50% distillation, °C max</td>
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<td>90% distillation, °C max</td>
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<td>final distillation, °C max</td>
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<td>residue, %(V/V) max</td>
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<tr>
<td>Vapor pressure, kPa</td>
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</tr>
<tr>
<td>From Sept 16 to Mar 15 max</td>
<td>88</td>
<td></td>
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<tr>
<td>From Mar 16 to Sept 15 max</td>
<td>74</td>
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<td>Gum content [2], mg/100ml max</td>
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<tr>
<td>Induction period [3], minute min</td>
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<tr>
<td>Sulfur content [4], %(m/m) max</td>
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<tr>
<td>Mercaptan content (meeting either)</td>
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<tr>
<td>Doctor test</td>
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<tr>
<td>Sulfur in form of mercaptan max</td>
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<td>Corrosion Copper strip(50 °C, 3h),degree, max</td>
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<tr>
<td>Acid &amp; base dissolved in water</td>
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<tr>
<td>Mechanical impurities and water</td>
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</tr>
<tr>
<td>Benzene content, %(V/V) max</td>
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</tr>
<tr>
<td>Aromatics content, %(V/V) max</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Olefins content, %(V/V) max</td>
<td>35[7]</td>
<td></td>
</tr>
</tbody>
</table>
Notes:
1 If oxygenates are blended into gasoline, the content of oxygen should not be greater than 2.7% (m/m), determined by method SH/T 0663.
2 Manganese content should not be greater than 0.018g/L, determined by the method depicted in Appendix B.
3 Iron compounds should not be used as additive. Its content should not be greater than 0.01g/L, coming mainly from contact with storage or transport tanks. Test method is proposed in Appendix C.
4 Cleansing agents should be added to gasoline sold in Beijing, Shanghai and Guangzhou.

Footnotes
[1] Although maximum lead content is specified in this standard, it does not imply lead can be added intentionally. In order to differentiate between leaded and unleaded gasoline, color pigment is not to applied to unleaded gasoline. No leaded gasoline will be manufactured by January 1, 2000 and will be phased out from market on July 1, 2000. The lead content should not be greater than 0.013g/L before July 1, 2000.
[2] The gum content can determined by GB/T 509, and arbitration should be based on results from on GB/T 8019.
[3] Induction period can be determined by GB/T 256, and arbitration should be based on results from GB/T 8018.
[4] Sulfur content can be determined by GB/T 17040, and arbitration should be based on results from GB/T 380.
[5] It is stipulated herewith that sulfur content in gasoline sold on the markets of Beijing, Shanghai and Guangzhou cannot be higher than 0.08%(m/m) since July 1, 2000. The limitation will be implemented nationwide since January 1, 2003.
[6] Put gasoline sample in a glass graduated cylinder. Suspended solid, mechanical impurities and water cannot be observed. If disagreement arises, GB/T 511 and GB/T 260 should be employed.

6 Labeling, package, transport, storage and delivery
Labeling, package, transport, storage and delivery should comply with SH 0164. The pipe line, container and pump used by leaded gasoline previously should be cleansed thoroughly before being used for gasoline up to this standard. All the pump and container should be labeled as:
“unleaded gasoline #90”, “unleaded gasoline #93”, “unleaded gasoline #95”. All the labels should be put in a conspicuous position for drivers’ attention.
7 Sampling method
2 liters of gasoline should be sampled for test and backup in accordance with GB/T 4756.

The first sets of Amendments
to <standard of unleaded petrol for motor vehicles> GB 17930-1999

The following amendments were approved by National Standardization Committee on September 9, 2002 and have been in force since October 1, 2002.

Amendment 1. The first article in the preface of original version saying ‘the sulfur limit of 0.08% (m/m) should be implemented nationwide since January 1, 2003…’. It is amended as ‘the sulfur limit of 0.08% (m/m) should be implemented nationwide since January 1, 2003, and the transition period will end on June 30, 2003’.

Amendment 2. The fifth article in the preface of original version saying ‘… to be enforced since January 1, 2003’. It is amended as ‘to be enforced since January 1, 2003, and the transition period will end on June 30, 2003’.

Amendment 3. The second note in Table 1 for specifications of unleaded gasoline in original version saying ‘Manganese content should not be greater than 0.018g/L, determined by the method depicted in Appendix B’. It is amended as ‘Manganese content should not be greater than 0.018g/L, determined by the method depicted in Appendix B. Gasoline containing manganese should be sheltered from light’

Amendment 4 The fifth footnotes in Table 1 for specifications of unleaded gasoline in original version saying ‘…The limitation [sulfur content not greater than 0.08%(m/m)] will be implemented nationwide since January 1, 2003.’ It is amended as ‘the sulfur limit of 0.08% (m/m) should be implemented nationwide since January 1, 2003, and the transition period will end on June 30, 2003’.

Amendment 5 The seventh footnote in Table 1 for specifications of unleaded gasoline in original version saying ‘Enforcement will start on July 1, 2000 in Beijing, Shanghai and Guangzhou and start nationwide on January 1, 2003’. It is amended as ‘Enforcement will start on July 1, 2000 in Beijing, Shanghai and Guangzhou and start nationwide on January 1, 2003. Transition period will end on June 30, 2003’.
The second sets of Amendments

to <standard of unleaded petrol for motor vehicles> GB 17930-1999

The following amendments were approved by National Standardization Committee on August 23, 2004 and have been in force since September 1, 2004.

The first note in Table 1 for specifications of unleaded gasoline I original version saying ‘If oxygenates are blended into gasoline, the content of oxygen should be lower than 2.7% (m/m), determined by method’. It is amended as ‘Methanol should not be used as a blending component and its content should not be greater than 0.1% (m/m). If other oxygenates are to be blended into gasoline, the oxygen content should not be greater than 2.7% (m/m), all based on SH/T 0663’.
The third sets of Amendments
to <standard of unleaded petrol for motor vehicles> GB 17930-1999

The following amendments were approved by National Standardization Committee on December 2, 2004 and will be in force since July 1, 2005.

Amendment 1 An additional paragraph is inserted before the second line from bottom as follows:

♦ This standard has been in force since January 1, 2000 and the main differences after the first and second sets of amendments to GB 17930-1999 include:

1. This standard is to be established on the basis of GB 17930-1999 in view to the upcoming implementation of emission standards for light motor vehicles (second phase). The amended standard will help meet the emission requirements stipulate in GB 18352.2-2001 <Emission limits for light motor vehicles and relevant test methods>

2. Limit on sulfur content in gasoline is to be modified not greater than 0.05%(m/m)

♦ The statement in the preface of original version saying ‘Appendix A, Appendix B and Appendix C are appendixes to this standard’ is to be deleted.

♦ More relevant standards are to be listed:
  GB/T 11140 Test method for sulfur content in liquid petroleum product
  GB 18352.2 Emission limits for light motor vehicles and relevant test methods(II)
  SH/T 0253 Test method for total sulfur content in light petroleum product
  SH/T 0689 Test method for total sulfur content in light hydrocarbon, motor fuels and other oil products
  SH/T 0693 Test method of aromatics (GC)
  SH/T 0711 Test method of manganese in gasoline (atomic absorption spectroscopy)
  SH/T Test method of iron in gasoline (atomic absorption spectroscopy)
  SH/T 0713 Test method of benzene and toluene in motor gasoline and aviation gasoline
  SH/T 0741 Test method of hydrocarbon families in gasoline (multi-dimension GC)
  SH/T 0742 Test method of sulfur in gasoline (X-ray)
♦ The limit of sulfur content in table 1 is to be amended as not greater than 0.05% (m/m), and four more test methods are to be used GB/T 11140, SH/T 0253, SH/T 0689, SH/T 0742. Arbitration is to be based on results from GB/T 380.

♦ The test method for benzene in table 1 is to be changed from Appendix A to SH/T 0713 and SH/T 0693. Arbitration is to be based on SH/T 0713.

♦ SH/T 0714 is to be added to the list of test methods for both olefin and aromatics. And arbitration is to be based on GB/T 11132.

♦ The second note to table 1 saying ‘The second note in Table 1 for specifications of unleaded gasoline in original version saying ‘ Manganese content should not be greater than 0.018g/L, determined by the method depicted in Appendix B’. It is to be amended as ‘manganese content refers to the total content of manganese in the form of methylcyclopentadienyl manganese tricarbonyl (MMT). It should not be greater than 0.018g/L, tested by method of SH/T 0711’.

♦ ‘Test method is proposed in Appendix C’ as stated in the third notes in Table 1 is to be amended as ‘test method is SH/T 0712’.
Preface

This standard is based on related European standard, EN 590-1998

The main differences between EN 590-1998 and this standard are:

♦ The related standards referred in this standard are national standards or industrial standards.

♦ Diesel fuels are classified into seven grades in terms of their flowability at low temperature and Cold Filter Plugging Point

♦ Density range is 820-860 kg/m³ (20 °C)

♦ No limits on total pollutants

♦ No limit on cloud point

♦ Water concentration is determined by GB/T 260 <test method for water in petroleum product>

♦ Addition of limit on and Test method for mechanical impurities

♦ Limits on boiling range, flash point and viscosity are agreement with those in GB 252 <national standard for light diesel fuel>

Appendix A is of a norm nature while Appendix is a referenced document.

This standard is put forward by SinoPec

This standard is to be interpreted and maintained by Research Institute of Petroleum Processing

This standard is drafted by Research Institute of Petroleum Processing

Chief rapporteur: Yang Guoxun

This standard is the first one regarding diesel fuel.

1 Scope

This standard covers classification, specification, test methods, sampling practice, labeling, package, transport and storage of automobile diesel fuels manufactured from crude oil with or without additives.

The product in question is suitable for diesel engines with compression ignition.

2 Referenced documents

All the documents referenced herewith constitute an essential part of this standard. Of all the dated documents only their original versions apply and their amended versions thereafter are not suitable for this standard. Nonetheless, the possibility is not precluded herewith of using
the newest versions of these referenced documents once all parties involved have reached agreement. Of all undated documents their newest versions apply to this standard.

♦ GB/T Test method for water in petroleum products


♦ GB/T 265 Test method for kinematic viscosity of petroleum product (and the calculation of dynamic viscosity)


♦ GB/T 380 Test method for sulfur in petroleum products (Lamp Method)

♦ GB/T 386 Test method for flammability of diesel fuels (Octane Number)


♦ GB/T 510 Test Method for wax appearance point of petroleum products

♦ GB/T 511 Test method for mechanical impurities of petroleum products and additives


♦ GB/T 5096 Test method for detection of copper corrosion from petroleum products by the copper strip tarnish test

♦ GB/T 6536 Test Method for Distillation of Petroleum Products at Atmospheric Pressure


♦ GB/T 11139 Calculation method for Octane number of distillate fuels

♦ GB/T Test method for sulfur in petroleum products (X-Ray spectrometry)

3 Designation of diesel fuel grades

3.1 Diesel fuels are classified into seven grades according to their wax appearance point, detail as below:

- **#10 diesel fuel for motor vehicles**—suitable for diesel engines with preheating apparatus
- **#5 diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than 8 °C
- **0# diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than 4 °C
- **-10# diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than -5 °C
- **-20# diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than -14 °C
- **-35# diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than -29 °C
- **-50# diesel fuel for motor vehicles**—suitable for diesel engines operating at ambient temperatures not lower than -44 °C

2 Labeling
3.2 Labels consist of three parts:
   National standards series number, grade number, brand name

3.3 Labeling example:
   GB/T ××××-10# diesel fuel for motor vehicle

 Specifications and test methods

The specifications and test methods are listed in Table 1.

<table>
<thead>
<tr>
<th>Items</th>
<th>10#</th>
<th>5#</th>
<th>0#</th>
<th>-10#</th>
<th>-20#</th>
<th>-35#</th>
<th>-50#</th>
<th>Methods</th>
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<tbody>
<tr>
<td>Oxidation stability</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SH/T 0175</td>
</tr>
<tr>
<td>Total insoluble substance, max, mg/100ml</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sulfur, % (m/m), max</td>
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<td></td>
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<td>GB/T 380</td>
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<td>10% distillation residue, max, % (m/m)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GB/T 268</td>
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<tr>
<td>Ash, % (m/m)</td>
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<td></td>
<td>GB/T 508</td>
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<td>Copper strip corrosion (50°C, 3h), grade</td>
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<td>GB/T 5096</td>
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<td>GB/T 511</td>
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<td>Lubricity</td>
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<td>ISO12156-1</td>
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<td>Wear scratch diameter (60°C), µm, max</td>
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<tr>
<td>Kinematic viscosity (20°C), mm²/s</td>
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<td>2.5-8</td>
<td>1.8-7.0</td>
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<td>Wax appearance point, °C, max</td>
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<td>-35</td>
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<td>GB/T 510</td>
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<td>Cold filtration point, °C, max</td>
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<td>8</td>
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<td>-44</td>
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<td>Flash point (closed cup), °C, min</td>
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<td>Boiling range</td>
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<td>90% distillation temperature, °C, max</td>
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<td>90% distillation temperature, °C, max</td>
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<td>Density (20°C), kg/m³</td>
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<td>GB/T 1885</td>
</tr>
</tbody>
</table>

*a* tested once a month to ensure the quality of final product. When source of crude oil, processing conditions,
5 Sampling

GB/T 4756 should be observed. 4 liters of diesel fuels are to be drawn for test and backup.

6 Labeling, package, transport and storage

SH 0164 should be observed.