Emission standards for gasoline and diesel vehicles in China are summarized in this chart for several vehicle weight classes up to 1470 kg reference weight. Standards are given as g/test for HC, CO, and NOx. Emissions are measured using the urban portion of the European MVEG-A driving cycle (so-called ECE R 15/04 test cycle). Details on this test cycle can be found in the European test cycles section of this database. This test cycle contains a group of three driving "hills" that are repeated a total of four times (total driving distance of 4.052 km). These current Chinese emission standards are not catalyst forcing.
Chinese (P.R.) Vehicle Emission Standards
Gasoline & Diesel Engines (to 1470 kg ref. wt.)

Emissions, g/test

Vehicle Reference Weight

[Bar chart showing emissions data for different vehicle weights and categories (HC, CO/10, NOx)]
Chinese (P.R.) Vehicle Emission Standards
Gasoline & Diesel Engines (to 3500 kg ref. wt.)

- Emission standards for gasoline and diesel vehicles in China are summarized in this chart for several vehicle weight classes up to 3500 kg reference weight. Standards are given as g/test for HC, CO, and NOx. Emissions are measured using the urban portion of the European MVEG-A driving cycle (so-called ECE R 15/04 test cycle). Details on this test cycle can be found in the European test cycles section of this database. This test cycle contains a group of three driving "hills" that are repeated a total of four times (total driving distance of 4.052 km). These current Chinese emission standards are not catalyst forcing.
Chinese (P.R.) Vehicle Emission Standards
Gasoline & Diesel Engines (to 3500 kg ref. wt.)

Emissions, g/test

Vehicle Reference Weight
In the 1999-2000 timeframe, China required new light-duty vehicles to comply with Euro 1 emission standards. Euro 1 light-duty standards for gasoline and diesel vehicles are summarized in this chart for three different weight classes of vehicles. Particulate matter standards (PM) apply only to diesel vehicles. These Euro 1 standards were initiated in the Beijing region starting in June 1999, and applied to all of China starting in 2000. Emissions for these light-duty vehicles are measured using the urban-only portion of the European MVEG-A driving cycle (see European test cycles for details). This test cycle includes a 40 sec. idle period before emissions sampling begins.
China PC Emission Standards based on Euro 1 MVEG-A test cycle w/40 sec. idle before sampling

PM stds. only apply to diesels; RM=reference mass

Introduced in 2000 (1999 in Beijing)
China began the implementation of Euro 2 standards for passenger cars nationwide in July 2004. These Euro 2 standards were required for all new vehicles sold in the Beijing and Shanghai metropolitan areas 12 months earlier, in July 2003. This chart summarizes European Stage 2 standards for passenger cars. Standards are shown for gasoline, indirect injection diesel (IDI), and direct injection diesel (DI) engines. Diesel standards include regulations on particulate matter (PM). These Stage 2 standards are measured using the European MVEG-A driving cycle (see chart under test cycles) with a 40 s idle period before emissions sampling begins.
China PC Emission Standards based on Euro 2 MVEG-A test cycle w/40 sec. idle before sampling

**Emissions, g/km**

- **Gasoline**
  - HC + NOx: 0.50
  - CO/10: 0.22

- **Diesel-IDI**
  - HC + NOx: 0.70
  - CO/10: 0.10
  - PM: 0.08

- **Diesel-DI**
  - HC + NOx: 0.90
  - CO/10: 0.10
  - PM: 0.10
China Light-Duty Gasoline Emission Standards Based on Euro 3 & Euro 4 Standards

- Hong Kong was the first city in China to implement Euro 3 light-duty standards starting in January 2001. Hong Kong is implementing Euro 4 light-duty standards in 2006. Beijing began implementation of Euro 3 standards in July 2005 and is targeting Euro 4 standards for 2008. Following Beijing, the State Council of Guangzhou implemented Euro 3 standards in September 2006. Euro 3 standards will begin nationwide in China in 2007 with Euro 4 standards targeted to begin nationwide in 2010. Euro 3 and 4 standards are measured using the European MVEG-A driving cycle (see chart under test cycles) with emissions sampling beginning from engine start.
China Light-Duty Gasoline Emission Standards Based on Euro 3 & 4 Standards

Emissions, g/km

Euro Stage 3

- HC: 0.20
- CO/10: 0.23
- NOx: 0.15

Euro Stage 4

- HC: 0.10
- CO/10: 0.10
- NOx: 0.08
China Light-Duty Diesel Emission Standards Based on Euro 3 & Euro 4 Standards

◆ Hong Kong was the first city in China to implement Euro 3 light-duty standards starting in January 2001. Hong Kong is implementing Euro 4 light-duty standards in 2006. Beijing began implementation of Euro 3 standards in July 2005 and is targeting Euro 4 standards for January 2007. Euro 3 standards will begin nationwide in China in 2007 with Euro 4 standards targeted to begin nationwide in 2010. Euro 3 and 4 standards are measured using the European MVEG-A driving cycle (see chart under test cycles) with emissions sampling beginning from engine start.
China Light-duty Diesel Emission Standards Based on Euro 3 & 4 Standards

Emissions, g/km

<table>
<thead>
<tr>
<th></th>
<th>CO/10</th>
<th>HC + NOx</th>
<th>NOx</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro Stage 3</td>
<td>0.064</td>
<td>0.56</td>
<td>0.50</td>
<td>0.050</td>
</tr>
<tr>
<td>Euro Stage 4</td>
<td>0.050</td>
<td>0.30</td>
<td>0.25</td>
<td>0.025</td>
</tr>
</tbody>
</table>
This chart summarizes Hong Kong light-duty diesel emission standards based on California LEV II standards. These LEV II standards require 120K mile durability. Additional information on the California LEV II standards can be found under the California on-road emission regulation section of this database. The standards will become effective on January 1, 2007.
China Light-duty Diesel Emission Standards based on California LEV II 120K Mile Standards

FTP Emissions, g/mi

- LEV: 0.090 NMOG, 0.42 CO/10, 0.07 NOx, 0.07 PM
- ULEV: 0.055 NMOG, 0.21 CO/10, 0.07 NOx, 0.01 PM
- SULEV: 0.01 NMOG, 0.10 CO/10, 0.02 NOx, 0.01 PM
China Heavy-Duty Engine Emission Stds. based on Euro Stage 1 & 2 Stds., ECE R49 13 Mode Engine Test

- Starting in 2001 China required heavy-duty vehicles to comply with Euro 1 emission standards. Euro 2 heavy-duty standards became effective nation-wide in September 2003. These Euro 1 and Euro 2 heavy-duty engine standards are summarized in this chart. The Euro 1 and Euro 2 standards apply to both gasoline and diesel vehicles with GVW > 3500 kg. Particulate matter standards (PM) apply only to diesel vehicles. Two sets of PM standards are included in these regulations. For Euro 1 a higher PM standard applies to engines with power ratings > 85 kW. For Euro 2 the higher PM level applies to engines with displacements < 700 cc and a speed rating > 3000 rpm. Emissions for heavy-duty vehicles are measured using the European R49 13 mode engine test cycle for both Euro 1 and Euro 2 standards.
China Heavy-Duty Engine Emission Stds. based on Euro Stage 1 & 2 Stds., ECE R49 13 Mode Engine Test

Heavy-duty vehicles defined as GVW > 3500 kg
PM(a): for Euro 1- engines <85kW;
for Euro 2- engines<700 cc with rated speed>3000 rpm
China Euro 3, 4 Heavy-Duty Engine Emission Stds.
ESC and ELR (OICA) Engine Tests

The Euro 3 and 4 regulations for new heavy-duty diesel engines sold in Hong Kong are summarized in this chart. These standards apply to conventional diesel engines (with or without oxidation catalysts). Euro 4 levels will take effect on October 1, 2006. In Hong Kong heavy-duty diesel vehicles are defined as those vehicles with GVW > 3865 kg. Particulate matter standards (PM) are included in all stages for heavy-duty diesel engines. In the Euro 3 standards, separate PM standards are included for engines with displacements < 750 cc and speed ratings > 3000 rpm. The emission standards for diesel engines in this heavy-duty class shown in this chart are measured using the OICA test cycles. This test cycle combines a load response test (ELR test cycle) and a steady-state engine schedule (ESC test cycle).
China Euro 3, 4 Heavy-Duty Engine Emission Stds. ESC and ELR (OICA) Engine Tests

Emissions, g/kWh

Euro 3
Heavy-duty vehicles defined as GVW > 3865 kg
Above standards apply to conventional engines with & without oxidation catalysts
PM(a): for Euro 3- engines<750 cc with rated speed>3000 rpm

Euro 4

HC CO/10 NOx/10 PM PM(a)

0.66 0.21 0.10 0.13 0.10 0.02

0.50 0.15 0.35 0.02
China Euro 3, 4 Heavy-Duty Engine Emission Stds.
ETC Engine Test

- The Euro 3 and 4 regulations for new heavy-duty diesel engines sold in Hong Kong are summarized in this chart. These standards apply to diesel engines equipped with advanced aftertreatment technologies (e.g., particulate traps, deNOx catalysts) and diesel engines fueled by gaseous fuels like natural gas. Euro 4 levels will take effect on October 1, 2006. In Hong Kong heavy-duty diesel vehicles are defined as those vehicles with GVW > 3865 kg. Particulate matter standards (PM) are included in all stages for heavy-duty diesel engines. In the Euro 3 standards, separate PM standards are included for engines with displacements < 750 cc and speed ratings > 3000 rpm. The emission standards for diesel engines in this heavy-duty class shown in this chart are measured using the ETC test cycle. The ETC test cycle is a transient engine dynamometer schedule.
China Euro 3, 4 Heavy-Duty Engine Emission Stds.
ETC Engine Test

Emissions, g/kWh

- NMHC
- CH4
- CO/10
- NOx/10
- PM
- PM(a)

Euro 3
- PM stds. only apply to diesels; CH4 stds. only apply to CNG engines
- Above standards apply to engines with advanced aftertreatment or gaseous fuel
- PM(a): for Euro 3- engines<750 cc with rated speed>3000 rpm

Euro 4

PM stds. only apply to diesels; CH4 stds. only apply to CNG engines
Above standards apply to engines with advanced aftertreatment or gaseous fuel
PM(a): for Euro 3- engines<750 cc with rated speed>3000 rpm
China has put in place the Euro 1 emission standards for motorcycles. These standards are summarized in this chart. Separate standards are provided for two stroke and four stroke engines. These standards use the ECE 40 driving cycle to measure motorcycle emissions with a specified warm up cycle. The driving cycle itself contains the same series of four driving cycles found in the urban phase of the European driving cycle used for passenger cars (MVEG-A drive cycle - urban portion only; see Europe test cycles in this database for details). Each cycle contains a series of three driving "hills." For motorcycles, the warm up period consists of driving two of these cycles followed by a 40 second idle period. The ECE 40 cycle continues after this idle period. Sampling of exhaust begins after the 40 second idle and ends at the conclusion of the fourth cycle. China began the implementation of these Euro 1 motorcycle emission standards in January 2003. These standards apply to all new motorcycles with engine displacements larger than 50 cc.
China Motorcycle Emission Standards
Two-Stroke & Four-Stroke Engines

Emissions, g/km

<table>
<thead>
<tr>
<th>Emission Type</th>
<th>Two-stroke</th>
<th>Four-stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC</td>
<td>4.0</td>
<td>3.0</td>
</tr>
<tr>
<td>CO/10</td>
<td>0.8</td>
<td>1.3</td>
</tr>
<tr>
<td>NOx</td>
<td>0.1</td>
<td>0.3</td>
</tr>
</tbody>
</table>
China Euro 3 Motorcycle Emission Standards

- Hong Kong Euro 3 emission standards for two-wheeled motorcycles are summarized in this chart. Standards apply to both two stroke and four stroke engines. These 2007 Hong Kong motorcycle standards are separated into two classes based on engine displacement: 50 cc < engine displacement < 150 cc, and engines > 150 cc in displacement. Note that motorcycles with engines < 50 cc are classified as mopeds and have their own emission standards (see Chinese moped standards in this database). For these 2007 standards Hong Kong uses the same ECE 40 driving cycle used for the 2003 EU motorcycle standards, with some modifications. For motorcycle with engine displacement < 150 cc, emissions are measured across all six modes of the test cycle (no warm-up modes). For motorcycles with engine displacement > 150 cc, emissions are measured across the six modes of the ECE 40 cycle and the EUDC drive cycle used for light-duty vehicles. In the EUDC portion of the test maximum speed is limited to 120 km/h. These 2007 motorcycle standards also include a 5 year/30,000 km durability requirement.
China Euro 3 Motorcycle Emission Standards

Emissions, g/km

- **HC**
- **CO/10**
- **NOx**

Durability requirement of 30,000 km/5 years
China Moped Emission Standards:
January 2003 Levels and 2006 Levels

- China has put in place the European Union emission regulations for moped/motor scooters summarized in this chart. These standards apply to small motorized bikes with engine displacements of 50 cc or less. These moped standards contain no separate provisions for two and four stroke engines. Emissions for this class of mopeds are measured using the ECE R47 test cycle. This cycle contains two steady speed modes. The bike is accelerated very quickly to 50 km/hr and cruised at this speed for about 50 seconds. This cruise is followed by a deceleration to 20 km/hr cruise condition that is maintained for about 35 seconds. The bike is decelerated to an idle from this second cruise. For the ECE R47 test cycle, a warm up phase consists of four of this two mode cruise cycles. Following this warm up, emissions are sampled during an additional four, two mode cruises to complete the ECE R47 test. The first stage of these moped regulations began in China in January 2003. Euro 2 moped requirements are expected to be implemented in 2006.
China Moped Emission Standards: January 2003 Levels and 2006 Levels

Emissions, g/km

- **HC+NOx**
  - Jan-03: 3.0 g/km
  - Jul-06: 1.2 g/km

- **CO**
  - Jan-03: 6.0 g/km
  - Jul-06: 1.0 g/km
Beijing and Hong Kong Fuel Sulfur Caps

- Beijing adopted Euro 2 fuel sulfur caps for both gasoline and diesel fuels in September 2004. These sulfur levels were further reduced to Euro 3 levels in July 2005 (150 ppm max. for gasoline, 350 ppm max. for diesel fuel). Hong Kong implemented Euro 4 fuel sulfur levels starting in January 2005 (50 ppm max. for gasoline, 150 ppm max. for diesel fuel). Nationwide fuel sulfur limits have not yet been set in China.
Beijing and Hong Kong Fuel Sulfur Caps

Max. Fuel S levels, ppm

Beijing: pre- Sept. 2004
Beijing: 9/1/2004
Beijing: 7/1/2005
Hong Kong: 1/1/2005

Gasoline
Diesel