Chapter IV.
Currently enforced standards on emissions of gaseous and particulate pollutants from freight road vehicles

IV.1. Existing standards on emissions of pollutants from freight road vehicles along the Asian Highway Network

IV.1.1. United Nations Regulations on wheeled vehicles

Harmonization of regulations of vehicles emissions is not a novelty and United Nations serves as platform for respective negotiations already. Recommended standards are being developed within the framework of World Forum for Harmonization of Vehicle Regulations (previously Working Party of experts on technical requirement of vehicles) under auspices of United Nations Economic Commission for Europe (ECE). Interested countries and institutions discuss and propose harmonized technical regulations on different aspects of operations, design of road vehicles and their parts since 1952.

The respective Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts was done in 1958. Currently, the third revision of the Agreement is in force. As of February 2018, there are 51 parties to the Agreement and 10 them are part of the AH network.

The Agreement is supplemented by 143 addenda containing regulations on specific parts and types of vehicles. Parties join each addendum separately. Among the regulations, four are relevant to the control and limiting emissions of gaseous and particulate pollutants from freight road vehicles:

- Regulation No. 15 Uniform provisions concerning the approval of vehicles equipped with a positive-ignition engine or with a compression-ignition engine with regard to the emission of gaseous pollutants by the engine - method of measuring the power of positive ignition engines - method of measuring the fuel consumption of vehicles (ceased to be applied by most of the parties).

- Regulation No. 24 Uniform provisions concerning:
  I. The approval of compression-ignition (C.I.) engines with regard to the emission of visible pollutants
  II. The approval of motor vehicles with regard to the installation of C.I. engines of an approved type
  III. The approval of motor vehicles equipped with C.I. engines with regard to the emission of visible pollutants by the engine
  IV. The measurement of power of C.I. engine.

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2 Under the title “Agreement Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations” ECE/TRANS/WP.29/2016/2.

3 Albania, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Egypt, Estonia, European Union, Finland, France, Georgia, Germany, Greece, Hungary, Italy, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malaysia, Montenegro, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russian Federation, San Marino, Serbia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, the former Yugoslav Republic of Macedonia, Tunisia, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland (http://www.unece.org).

– Regulation No. 49 Uniform provisions concerning the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines and positive-ignition engines for use in vehicles.

– Regulation No. 83 Uniform provisions concerning the approval of vehicles with regard to the emission of pollutants according to engine fuel requirements.

Countries along the Asian Highway network use the definitions, emission limits, tests methods and other provisions of these regulations while setting the national standards even if they are not parties to the 1958 Agreement (for instance, Indonesia, Pakistan and some other).

Technical regulations on the wheeled vehicles that are applied in the EAEU countries (see more details in II.1.3 above) directly use three of these regulations, namely Regulation No. 24 (revision 03), Regulation No. 49 (revision 05), Regulation No. 83 (revision 05) (up to 2017), Regulation No. 83 (revision 06) (after 2017), as standards for vehicular emissions limits and control1.

In 1998, a Registry of the United Nations Global Technical Regulations (GTR) was created by an agreement parallel to the 1958 Agreement. The Agreement (Agreement concerning the establishing of global technical regulations for wheeled vehicles, equipment and parts which can be fitted and/or be used on wheeled vehicles2, Geneva, 1998) entered into force in 2000 and as of February 2018 has 36 parties3. Among 19 GTR established to the UN Registry the following are concerned emissions of the freight road vehicles:

– UN GTR No. 4 - Test procedure for compression-ignition (C.I.) engines and positive-ignition (P.I.) engines fuelled with natural gas (NG) or liquefied petroleum gas (LPG) with regard to the emission of pollutants.

– UN GTR No. 5 - Technical requirements for on-board diagnostic systems (OBD) for road vehicles.

– UN GTR No. 10 - Off-cycle emissions.

– UN GTR No. 15 - Worldwide harmonized Light vehicles Test Procedure.

– UN GTR No. 19 - EVAPorative emission test procedure for the Worldwide harmonized Light vehicle Test Procedure.

European Union and a number of countries in Asia use the test procedures in GTR No. 4 (World Harmonized Stationary Cycle and World Harmonized Transient Cycle, both are applied to heavy-duty vehicles) and GTR No. 15 (Worldwide harmonized Light vehicles Test Procedure (WLTP)) in the most recent standards on emissions or the standards to be implemented in coming years.

Important tool to implement and facilitate control of the emissions of vehicles in international road transport is provided by the Agreement concerning the adoption of uniform conditions for periodical technical inspections of wheeled vehicles and the reciprocal recognition of such inspections4, done at Vienna in 1997 also under auspices of the United Nations ECE. The Agreement envisages creating of Rules for the periodic technical inspections, blank for the certificate of such inspections. Certificates of the technical inspections carried in accordance with the Rules are reciprocally recognized by the parties to the Agreement. Freight road vehicles falls under the scope of the Agreement. The Agreement entered into force in 2001 and as of February 2018, there are 13 parties5.

As of March 2018, two Rules on technical inspection are in force whereas Rule No.1 – Protection of the environment sets procedures for testing vehicles’ exhaust emissions, emissions limits based on Regulations No. 24, 49, 83.

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3 Australia, Azerbaijan, Belarus, Canada, China, Cyprus, European Union, Finland, France, Germany, Hungary, India, Italy, Japan, Kazakhstan, Lithuania, Luxembourg, Malaysia, Netherlands, New Zealand, Norway, Republic of Korea, Republic of Moldova, Romania, Russian Federation, San Marino, Slovakia, Slovenia, South Africa, Spain, Sweden, Tajikistan, Tunisia, Turkey, United Kingdom of Great Britain and Northern Ireland, United States of America (http://www.unece.org).


5 Albania, Belarus, Bulgaria, Estonia, Finland, Georgia, Hungary, Kazakhstan, Moldova, Netherlands, Romania, Russian Federation, San Marino, Ukraine (http://www.unece.org).
Reciprocal recognition of the technical inspection certificates in combination with harmonized emissions standards would facilitate the international road transport by eliminating need for procedures related to the emission testing in regards each road operation.

IV.1.2. EU regulations

To harmonize the national legislations of its member-states, European Union has developed comprehensive set of limits on emissions of pollutants by road vehicles, tests to identify the amount of pollutants from a vehicle depending on engine and fuel types, size of vehicles, requirements to the on-board diagnostic systems.

The limits and test procedures are set for the:

- tailpipe emissions - emissions of gaseous pollutants for positive-ignition engines and gaseous and particulate pollutants for compression-ignition engines;
- evaporative emissions - hydrocarbon vapours lost from the fuel system of a motor vehicle other than those from tailpipe emissions;
- emissions of crankcase gases;
- durability of pollution control devices, etc.

Allowable emissions of pollutant by road vehicles are steadily reduced stage by stage, number of controlled pollutants increases (Annex IV). The early standards limited exhaust gas emissions of carbon monoxide, combined emissions of hydrocarbons and oxides of nitrogen, and particulates. The latest ones are more detailed and specify the limit values for carbon monoxide, total hydrocarbons, non-methane hydrocarbons, oxides of nitrogen, methane, combined mass of hydrocarbons and oxides of nitrogen, mass of particulate matter and number of particles.

The series of standards are labelled as Euro with Arabic numbers for light-duty vehicles (the latest version introduced is Euro 6) and roman numbers for heavy-duty vehicles (the latest version introduced is Euro VI). The latest versions entered into force in 2013 (Euro VI) and 2015 (Euro 6).

As shown in Table 20, EU standards on CO, HC, NOx, and PM were increased by 52.5 per cent, 60.0 per cent, 71.4 per cent, and 66.7 per cent, respectively in Euro III compared to Euro II. In Euro IV, CO, HC, NOx, and PM were increased by 71.4 per cent, 69.7 per cent, 70.0 per cent, and 20 per cent, respectively compared to Euro III. The CO standard remains the same up to Euro VI. However, HC, NOx, and PM standards are continuously increasing. Moreover, the HC and NOx standards are significantly increased upgrading from Euro V to Euro VI.

Table 19 EU Emission standards for heavy-duty diesel engines: steady-state testing

<table>
<thead>
<tr>
<th>Stage</th>
<th>Date</th>
<th>Test</th>
<th>CO</th>
<th>HC</th>
<th>NOx</th>
<th>PM</th>
<th>PN</th>
<th>Smoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro I</td>
<td>1992, ≤ 85 kW</td>
<td>ECE R-49</td>
<td>4.5</td>
<td>1.1</td>
<td>8.0</td>
<td>0.612</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1992, &gt; 85 kW</td>
<td></td>
<td>4.5</td>
<td>1.1</td>
<td>8.0</td>
<td>0.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro II</td>
<td>1996.10</td>
<td>ESC &amp; ELR</td>
<td>4.0</td>
<td>1.1</td>
<td>7.0</td>
<td>0.25</td>
<td></td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>1998.10</td>
<td></td>
<td>4.0</td>
<td>1.1</td>
<td>7.0</td>
<td>0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Euro III</td>
<td>1999.10 EEV only</td>
<td>ESC &amp; ELR</td>
<td>1.5</td>
<td>0.25</td>
<td>2.0</td>
<td>0.02</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2000.10</td>
<td></td>
<td>2.1</td>
<td>0.66</td>
<td>5.0</td>
<td>0.10(1)</td>
<td>0.8</td>
<td></td>
</tr>
</tbody>
</table>

1 Vehicles of categories M₁ (vehicles used for the carriage of passengers and comprising no more than eight seats in addition to the driver’s seat), M₂ (Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat, and having a maximum weight not exceeding 5 metric tons), N₁ (Vehicles used for the carriage of goods and having a maximum weight not exceeding 3.5 metric tons) and N₂ (Vehicles used for the carriage of goods and having a maximum weight exceeding 3.5 but not exceeding 12 metric tons) as defined in Annex II to Directive 70/156/EEC with a reference mass not exceeding 2,840 kg.

‘Reference mass’ means the mass of the vehicle in running order less the uniform mass of the driver of 75 kg and increased by a uniform mass of 100 kg.

2 M₃ (vehicles designed and constructed for the carriage of passengers and comprising no more than eight seats in addition to the driver’s seat), M₄ (vehicles designed and constructed for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat, and having a maximum mass not exceeding 5 tons), N₃ (vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 3.5 tons but not exceeding 12 tons) as defined in Annex II of Directive 2007/46/EC with a reference mass exceeding 2,610 kg to all motor vehicles of categories M₅ (vehicles designed and constructed for the carriage of passengers, comprising more than eight seats in addition to the driver’s seat, and having a maximum mass exceeding 5 tons) and N₅ (vehicles designed and constructed for the carriage of goods and having a maximum mass exceeding 12 tons), as defined in that Annex.
<table>
<thead>
<tr>
<th></th>
<th>2005.10</th>
<th>2008.10</th>
<th>2013.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Euro IV</td>
<td>1.5</td>
<td>0.46</td>
<td>3.5</td>
</tr>
<tr>
<td>Euro V</td>
<td>1.5</td>
<td>0.46</td>
<td>2.0</td>
</tr>
<tr>
<td>Euro VI</td>
<td>WHSC</td>
<td>1.5</td>
<td>0.13</td>
</tr>
</tbody>
</table>


Notes:
1) PM=10.13 g/kWh for engines < 0.75 dm³ swept volume per cylinder and a rated power speed > 3,000 min⁻¹

Since 2005 also durability has been taken into account. For all engine sales and registrations, manufacturers should demonstrate that engines comply with the emission limit values for useful life periods. For heavy-duty vehicles having a maximum mass exceeding 12 tonnes (vehicle category N3) this is 500,000 km / 7 years for Euro IV-V and 700,000 km / 7 years for Euro VI (Annex IV).

The Euro III and Euro IV standards were preceded by the introduction of more stringent fuel regulations that required a minimum diesel cetane number of 51 (year 2000), maximum diesel sulfur content of 350 ppm in 2000 and 50 ppm in 2005, and maximum petrol (gasoline) sulfur content of 150 ppm in 2000 and 50 ppm in 2005. “Sulfur-free” diesel and gasoline fuels (≤ 10 ppm S) became available in 2005 and became mandatory from 2009.

There are some connections between the EU and United Nations Regulations being developed within ECE framework. For instance, emission limits of the Euro 6 standard (Commission Regulation (EU) No. 459/2012) and of the Regulation No. 83 (revision 5) are equivalent, but some technical matters differ. Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on emission limits for heavy-duty vehicles (Euro VI) and related matters references to Regulation No. 49 in some aspects of tests and definitions. Prior to 2011, the standards on emissions for heavy-duty vehicles were based on European steady state cycle (ESC) and European transient cycle (ETC). Commission regulation No 582/2011¹ switched testing methods to WHSC and WHTC.

Standards developed by EU over years are used by countries along AH network in setting their emission limits and tests procedures, usually by adopting earlier versions based on ability of a country’s manufacturers (if any), vehicles’ users and control authorities to comply.

IV.1.3. Diversity of standards on emissions along the Asian Highway network

Following economic and social differences between the countries along the AH network, the standards on emissions of pollutants by freight road vehicles are diverse (Annex II):

- six countries use national standards;
- one country uses AFAGIT Protocol 4, that lays out only one limit on emissions: “exhaust emission (smoke) - 50% (Opacity or Bosch unit) or 50 Hartridge Smoke Units (HSU)²;
- one country directly applies 1958 Agreement and United Nations regulations No. 24, No. 49 and No. 83;
- four countries use EAEU technical regulations based on 1958 Agreement and United Nations regulations;
- five countries apply Euro 1, 2 for light duty vehicles and Euro I, II for heavy-duty vehicles in some cases making national additions or combining them with United Nations regulations;
- three countries use Euro 3 and Euro III standards;
- four countries use Euro 4 and Euro III/IV, sometimes in combination with United Nations regulations No. 49 and No. 83;
- six countries use Euro 5, 6 and Euro V, VI, some in combination with national standards.

In other words, the latest standards (Euro 5, 6, Euro V, VI or latest revisions of the ECE regulations No. 49 and No. 83) are already in force or will be enforced in coming years in almost one third (31%) of the AH countries. Euro 3-4, Euro III-IV are applied by about one fifth of the countries (22%). And 40% of the countries use nationally developed standards that are difficult to equate to EU or United Nations standards or early stages of those standards.

Availability of engines and fuels complying to the stricter emission standards provide an opportunity for speeding the process of making the road vehicles park in Asia greener. This opportunity is already used by India: after fully implementing Bharat Stage IV standard (equivalent to the Euro 4) in 2017, the country is in the preparation to the implementation of the Bharat Stage VI standard (equivalent to the Euro 6) in 2020. Skipping one stage is motivated by both urgent need to tackle the ambient air pollution and by economic reasons. Increasing air pollution and associated risks and burden made legislators to both speeding up the implementation of the new stage (2020 instead of 2021 as planned initially) and to decide on nationwide introduction of standard (previous two stages were implemented in phases)¹. This experience is watched closely by other countries along Asian Highway, as for instance, Thailand is considering jumping to Euro V standard from Euro III.

Differences in the standards are observed in units used, tests recommended, limits values, number of indicators monitored.

For instance, in Bhutan the limit value for emissions of pollutants for diesel engines is set in HSU², Cambodia, Sri Lanka measure carbon monoxide in percentage as per volume³. Both measure and limit emissions of carbon monoxide, hydrocarbon and dark fume/particulate matters.

On the other hand, the latest Euro 6⁴ standards as well as Regulation No. 83 (revision 5) and China ⁵⁵ set limits for emissions of carbon monoxide, total hydrocarbons, non-methane hydrocarbons, oxides of nitrogen, combined mass hydrocarbons and oxides of nitrogen, particulate matter in units of mass, mg or g, per km. Particulate matter is also counted in number of particulates per km. For heavy-duty vehicles standard Euro VI⁶ the controlled pollutants list is a bit different: there are two more pollutants, methane and ammonia, and no combined mass of hydrocarbons and oxides of nitrogen. The emissions are measured in mg/kWh, except for

¹ Paresh Kumar Goel, ‘Presentation of Ministry of Road Transport and Highways, New Delhi, India’ (presented at the Expert Group Meeting on Strengthening the capacity of ESCAP member States to harmonize standards on weights, dimensions and emissions of road vehicles for facilitation of transport along the Asian Highway network, Tbilisi, Georgia, 2019) <https://www.unescap.org/sites/default/files/India_17.pdf>.

² Hartridge Smoke Unit is used to measure the opacity of the exhaust gases of engines.

³ Royal Government of Cambodia, ‘Anukret/42ANK-BK/01Jul00: Anukret on Air Pollution and Noise Disturbance Control’.


Tests methods used in the countries reflect the standards they select. The countries that follow EU regulation use or plan to use New European Drive Cycle (light-duty vehicles), ESC, ETC, European Load Response (heavy-duty vehicles) and related ones. Countries that follow United Nations Regulations among other tests use or plan to use Standard Road Cycle, WLTC (light-duty vehicles), Standard Bench Cycle, Standard Diesel Bench Cycle, WHTC, WHSC (heavy-duty vehicles). Since the EU and United Nations regulations are overlapping in some parts, the tests methods from both lists might be used in one country. With progressing to stricter standards, the countries may increase use of WHSC and WHTC, for instance, India announced switching to them in Bharat Stage VI to be enforced in 2020.

The tests are not necessary used in the form they are defined in Europe or by United Nations regulations. China, for example, uses tests to the Euro 6 standard but with slight amendments to the procedures.

There are nationally applied tests, such as JE05 emission test cycle for heavy-duty vehicles and JC08 emission test cycle for light-duty vehicles in Japan. It is planned that in 2018-2019, Japan will switch to WHSC, WHTC and WLTC.

Similar to the situation with standards on vehicle weights and dimensions, there are issues in:

- Availability of the emissions standards and their availability in other languages than national. Available versions are not necessarily most recent or presently enforced ones.
- Comparability of limit values. While it is possible to compare standards, especially if they use the same standards’ series as the basis (Euro series or United Nations ECE Regulations) changes that are introduced by countries to tests procedures might complicate the process.
- Important issue specific to the standards on emission of pollutants is the scope of application of the standards. Depending on stage of the introduction of a standard, country may apply the new standard to:
  - Newly imported vehicles;
  - Vehicles newly produced domestically;
  - All of the operating vehicles.

Consequently, it might be the case that vehicles with different level of emissions are circulating on the roads. Then the questions is what policy is applied to the commercial vehicles temporarily entering to a country: must they comply with strictest limits in force (meaning that the vehicles manufactured prior to a cut date or polluting more than those limits allow are restricted for entry) or may comply with a limit permissible to the vehicles of similar age.

### IV.2. Harmonization of standards emissions of gaseous and particulate pollutants from freight road vehicles: need for and potential benefits

Regulations of emissions of the road vehicles are aimed at improving the quality of the ambient air and health and wellbeing of people. Road transport is responsible for 75% of the carbon dioxide emissions of the whole transport sector. Air pollution is severe issue in multiple locations across Asia. Road transport in Asia contributes 23% of the global emissions and regional share is projected to reach almost one third by 2030.
World Bank estimated that in East and South Asia, air pollution caused welfare losses equivalent to 7.5% of GDP\(^1\).

Pollution has complex and profound effect on human health and economies in Asia. Pollutants emitted by vehicles can harm respiratory tracts, nervous system, cardiovascular system, affect skin and cause other adverse effects on human health. In turn, these effects are translated into the healthcare costs, losses for overall economy of countries and drop in people’s well-being. Carbon dioxide, methane and other greenhouse gases contribute to climate changes and related damage.

Apart from environmental impact, regulations on emissions of pollutants by vehicles also have certain effect on trucking and automotive industries. As in case with the freight road vehicles’ dimensions and weight limits, compliance with the emission standards has a potential to be used as a non-tariff barrier to trade both in terms of international road transport operations and impact on automotive industry.

Different, incoherent environment policies in general might be source of imbalance in international trade and international allocation of resources, especially if there are no valid reasons for such difference. This fact was acknowledged by OECD as early as in 1972 when the organization called its members to harmonize the environment policies in its Guiding Principles Concerning the International Economic Aspects of Environmental Policies. Harmonizing the emission standards for the AH network, might also benefit vehicle manufacturers who are most likely to have already some of the production lines adopted to the cleaner vehicles with or without the additional emission related devices for some part of their markets and it would impact the advantages that manufacturing of more polluting vehicles might give.

For trucking industry and international road transport in the region harmonization of the standards on emissions of gaseous and particulate pollutants from freight road vehicles along the AH network is important component to the elimination of non-tariff barriers to trade and impediments as well. Bilateral agreements on road transport are likely to stipulate that while within the territory of the partner state the vehicles should follow the respective regulation of the said state, meaning that compliance with the emission requirements is one of the factors in granting entrance to the trucks of partner countries. Then the transport operators have to take into account emission limits of both their country and countries to which they plan to make transport operations. If the standards are harmonized, mutual recognition of the certificates and approvals implemented, then the barriers to trade due to testing, licensing and development the standards per se would be removed or lowered.

Harmonization of the standards would not only remove barriers to trade, it would provide new opportunities by ensuring seamless connectivity and efficient international road transport.

IV.3. Enforcement mechanisms for the standards on emissions of pollutants by freight road vehicles: examples from ESCAP region

Enforcement mechanisms for standards on emissions cover several aspects:

1) type approval for new vehicles;
2) conformity of production;
3) control of emissions during the life span of a vehicle.

Counties may have their own regulations on granting type approval to the newly manufactured or imported vehicles, controlling conformity of the vehicles manufactured in accordance with these type approvals later on and thus have understanding of which models of vehicles (truck, trailers, etc.) of which years of production they would allow to enter their territories.

Testing of the prototypes for granting type approval is often carried out by accredited laboratories in accordance with the procedures and limits set by countries. These tests may be performed not for every model of vehicles and engines, but for a group (type) of them identified based on similarity in design. Conformity of production is either proved by quality management systems of the manufacturer, regular reports by manufacturer or by testing selected vehicles from assembly lines or specially purchased. These methods may be used simultaneously\(^2\).

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2 See more details on procedures for type approval and conformity of production in EU, USA, China and India in:
- Gaurav Bansal and Anup Bandivadekar, Overview of India’s Vehicle Emissions Control Program: Past Successes and Future Prospects
While road vehicles manufacturers are the target for the first two aspects of enforcement mechanism on emissions of pollutants by road transport, transport operators and vehicle owners are responsible for the vehicle’s emissions during its usage. Control of the vehicle’s emissions during its life span is implemented during regular technical inspections, maintenance and via checks on roads by traffic police or other authorized agencies. Compliant vehicles are granted certificates to use the roads. In case the vehicle is found to exceed the emission limits, depending on the situation, vehicle owner/driver might be fined; vehicle might be banned from roads completely or till needed improvements are made.

Below are some examples on the control of the emissions of the vehicles already in use from countries along the AH network.

In Bhutan, emissions of a vehicle are checked during regular inspections and on roads by decision of a traffic police or other authorized person. Commercial vehicles are required to undergo regular tests for emission every six months. If the vehicle’s emissions exceed established limits, the owners of the vehicle are fined and after the second offence the vehicle may be banned from traffic.

In China, the emission level of a vehicle is checked during the regular technical inspections and the roadworthiness certificate is not granted if the emissions exceed the limits. Vehicles’ emissions might be also checked at the places of parking or repairing or with remote sensing technics. If the vehicle with the emission levels incompatible with the existing emission limits is detected, the fine is imposed on the driver.

In India, any vehicle more of a year old should have a “Pollution under control” certificate that according to the Central Motor Vehicles Rules, 1989, is valid for six months but this term may be changed by state governments. For example, in Delhi the certificate is valid for 1 year if the vehicle is Bharat Stage-IV compliant and three months otherwise. The certificate is issued by authorized facilities for a fee. Issued certificate is valid throughout India. In case, a vehicle with a valid “Pollution under control” certificate is detected to exceed allowable pollution limits, the certificate is recalled and the vehicle is required to obtain a new one within seven days. Responsibility for failure to comply is on persons who drive or allow the vehicle to be driven. The fine rises if the offence is not the first.

In the Russian Federation, in case a truck is proved to emit pollutants at the level exceeding the limits, a warning is issued or a fine is applied. Vehicles are tested for emissions either during technical inspections, regular maintenance or on roads by inspectors of the General Administration for Traffic Safety.

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1 Road Safety and Transport Authority Ministry of Information and Communications Royal Government of Bhutan, ‘Road Safety and Transport Regulations, 1999, as Amended in 2015’.
2 ‘People’s Republic of China: Air Pollution Control Law. Second Amendment, 2015.’
3 ‘People’s Republic of China: Air Pollution Control Law. Second Amendment, 2015.’