



### **Bharat Stage Emission Standards (BSES)**

The first emission norms for Indian motor vehicles were the idle emission limits that came into effect in 1989. These regulations were replaced by mass emission limits for petrol engines in 1991 and diesel engines in 1992. By 1995, the use of catalytic converters was made compulsory for all cars that were sold in metros.

These norms are instituted by the Government of India to define the output of permissible air pollutants from an internal combustion engine that power the motor vehicles. These emission norms and the timelines for their introduction are decided by the Central Pollution Control Board, which comes under the Ministry of Environment & Forests and climate change.

The Bharat Stage Emission Standards are based on European norms, which are commonly classified as 'Euro 2', 'Euro 3', et al. The regulations were first launched in India in 2000 and have seen several revisions in the last two decades. India 2000, which was based on the Euro 1 standards, was replaced with Bharat Stage II (BSII) norms in 2001. These were followed by BS3, while the latter was then replaced with BS4 standards. India is now all set to leapfrog to BS6 emission standards, which will roll out on 1 April 2020. The sale of BSIV-compliant vehicles will be banned with the introduction of the next level of emission standards. The implementation schedule of automotive emission standards in India is summarised in the following table

<b>Standard</b>	<b>Reference</b>	<b>YEAR</b>	<b>Region</b>
India 2000	Euro 1	2000	Nationwide
Bharat Stage II	Euro 2	2001	NCR, Mumbai, Kolkata, Chennai
		2003	NCR + 13 Cities†
		2005	Nationwide
Bharat Stage III	Euro 3	2005	NCR*, 13 Cities†
		2010	Nationwide
Bharat Stage IV	Euro 4	2010	NCR*, 13 Cities‡
		2017	Nationwide
Bharat Stage V	Euro 5	(to be skipped)	
Bharat Stage VI	Euro 6	2018	Nationwide

### **What is BSI?**

Technically speaking, Bharat Stage 1 or BS1 is an incorrect way to refer to the country's first automotive emission norm that was in reference to the European standards. While it was equivalent to the Euro 1 regulations, the first standard was known as 'India 2000.' It allowed a maximum Carbon Monoxide emission of 2.72 g/km, Hydrocarbons+Nitrogen Oxides discharge of 0.97 g/km, and Respirable suspended particulate matter discharge of 0.14.

To achieve India2000-compliance, the carmakers were required to re-tune the carburetor, secondary air intake system, exhaust gas recirculation system, increase the catalyser capacity along with the addition of a trimetal coating to the system.

### **What is BSII?**

Sales of BSII-compliant cars took place between 2001 and 2010. A major change that was required by the carmakers to upgrade to Bharat Stage II standards was the replacement of the carburetor by a Multi-point Fuel Injection (MPFI) system. BSII norms led to a vast reduction in the emissions, with a maximum permissible Carbon Monoxide emission of 2.2 g/km, Hydrocarbons+Nitrogen Oxides discharge of 0.50 g/km, and Respirable suspended particulate matter discharge of 0.08. Moreover, the Sulphur content in the Bharat Stage II-compliant fuels was restricted to 500 PPM.

### **What is BSIII?**

BSIII regulation was first rolled out in 2005 and their sale was made mandatory across the nation by 2010. The introduction of the more stringent norms led to a remarkable reduction in emissions from petrol-powered passenger vehicles, with a maximum permissible Carbon Monoxide emission of 2.3 g/km, Hydrocarbons+Nitrogen Oxides discharge of 0.35 g/km, and Respirable suspended particulate matter discharge of 0.05.

The diesel models emitted a peak carbon monoxide of 0.64 g/km, a nitrous oxide of 0.50 g/km, and Hydrocarbons+Nitrogen Oxides discharge of 0.56 g/km. Furthermore, the Sulphur content in the Bharat Stage III-compliant fuels was restricted to 100 PPM.

Carmakers achieved compliance with the BSIII emissions by installing a catalytic converter that curbed the discharge of Carbon Monoxide and Hydrocarbons.

## **What is BSIV?**

BSIV norms were made mandatory across the country in April 2017.

The pollutants from petrol-powered passenger vehicles were restricted to a Carbon Monoxide emission of 1.0 g/km, Hydro carbons+Nitrogen Oxides discharge of 0.18 g/km, and Respirable suspended particulate matter discharge of 0.025.

The diesel models emitted a peak carbon monoxide of 0.50 g/km, a nitrous oxide of 0.25 g/km, and Hydro carbons+Nitrogen Oxides discharge of 0.30 g/km.

Also, the Sulphur content in the Bharat Stage IV-compliant fuels was restricted to 50 PPM.

In order to convert BSIII-compliant engines to BSIV units, car manufacturers added bigger catalytic converters to minimise nitrogen-based emissions.

Additionally, the carmakers tweaked the ECU to ensure more efficient combustion. BSIV motors also received modified air intakes and exhaust systems.

## **What is BSVI?**

India will embrace BSVI emission norms on 1 April 2020, which means our country will skip on BSV and will directly jump to Bharat Stage VI regulations.

The upcoming emission standards will restrict tailpipe discharge from petrol cars to a Carbon Monoxide emission of 1.0 g/km, Hydro carbons+Nitrogen Oxides discharge of 0.16 g/km, and Respirable suspended particulate matter discharge of 0.05.

The diesel models will emit a peak carbon monoxide of 0.50 g/km, a nitrous oxide of 0.06 g/km, and Hydro carbons+Nitrogen Oxides discharge of 0.17 g/km.

0.07 Also, the Sulphur content in the Bharat Stage VI-compliant fuels will be restricted to 10 PPM.

