

STAGE 3 CHINA FUEL CONSUMPTION STANDARD FOR COMMERCIAL HEAVY-DUTY VEHICLES

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In April 2016, the third stage of China's heavy-duty vehicle fuel consumption standard was released for public comment. The China Automotive Technology and Research Center (CATARC) proposed the draft rule, which retains the same scope as the second stage of national standards (GB 30510-2014) by setting limits on fuel consumption for new commercial trucks, dump trucks, tractors, coaches, and buses with a gross vehicle weight over 3,500 kg. Similar to the previous two stages, the Stage 3 standard will regulate heavy-duty vehicles with diesel and gasoline engines. The new standard will go into effect on July 1, 2019, for new type approvals, and on July 1, 2021, for new heavy commercial vehicles sold in China.

BACKGROUND

In China, heavy-duty vehicles (HDVs) currently represent about 10% of the new vehicle market. However, because of their high fuel consumption and relatively heavy use in terms of vehicle kilometers traveled, HDVs account for nearly 50% of China's total on-road fuel use.¹

Two stages of HDV fuel consumption standards—"industry" and "national" standards—were adopted earlier this decade. The Stage 1 Industry Standard was implemented in mid-2012 for type approval of new models, and in mid-2014 for all vehicles. Three common types of HDVs—tractors, straight trucks, and coaches—are regulated under the Industry Standard. The Stage 2 National Standard was implemented in mid-2014 for type approval of new models, and in mid-2015 for all models. It incorporates city buses and dump trucks and tightens fuel consumption limits for tractors, trucks, and coach buses by 10.5%–14%, compared to the limits under the Industry Standard.

In September 2015, China announced that it would release the draft of the Stage 3 HDV fuel consumption standard for public comment in 2016,² with the plan to implement the

1 "Development of Heavy-duty Vehicle Fuel Consumption Standards in China," October 2013, China Automotive Technology and Research Center, http://www.theicct.org/sites/default/files/CATARC%20PPT_EN_1.pdf.
2 "Fuel consumption limits for heavy-duty commercial vehicles," April 2016, China Automotive Technology and Research Center, <http://www.catarc.org.cn/Upload/file/bzyj/PDF/zhengqiyujian-sc32-5.pdf>.

standard in 2019.³ Preparation for the Stage 3 standard started in 2014, and it included a series of discussions with industry stakeholders, as well as testing and simulations. It was estimated that the average fuel consumption of heavy-duty vehicles in China is 10%–15% higher than in other, more developed markets, such as United States and Japan.⁴ In particular, fleet-wide tractor-trailer fuel consumption rates are about 39 L/100 km and 36–38 L/100 km in the United States and the European Union (EU), but are 44 L/100 km in China.⁵ The goal of this new stage of standard is to reduce fuel consumption by about 15% in 2020 from the 2015 levels, in order to further reduce the gap between China and other more developed markets globally.

THE PROPOSED NATIONAL STAGE 3 STANDARD

While Stage 3 inherits the same regulated vehicle segments as Stage 2 (including new commercial trucks, dump trucks, tractors, coaches, and city buses with gross vehicle weight over 3,500 kg), it excludes specialized vocational vehicles from all of the six sub-categories based on body type (i.e., box, tank, stake, dump, crane, and special structure). These specialized vocational vehicles are designed for transporting and have some additional purposes, such as mixing and spreading asphalt and lifting materials. In addition, the proposed standard only regulates vehicles with diesel or gasoline engines, meaning about 85% of the HDVs are regulated. The rest of the market, not covered in the standard, includes 5% specialized vocational vehicles and 11% of HDVs with alternative fuel engines, such as natural gas and electricity (Figure 1).

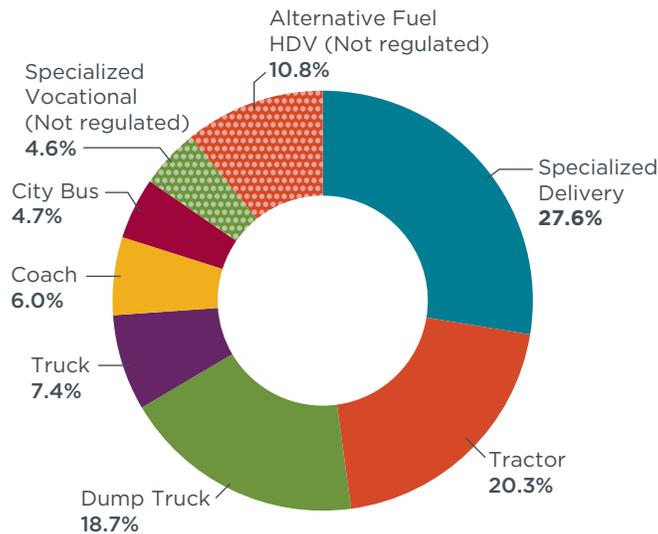


Figure 1. Heavy-duty vehicle registration by vehicle segment and fuel type.⁶

Stage 3 implements the same testing method as the Stage 2 standard, namely, chassis dynamometer testing running on the C-WHTC cycle for base models and simulation for variant models,⁷ and uses liter-per-100 km as the evaluation metric, consistent with the previous two stages. The data for determining the limits come from chassis

3 “China’s commitment to improving heavy-duty vehicle efficiency,” September 2015, The International Council on Clean Transportation, <http://www.theicct.org/news/chinas-commitment-improving-heavy-duty-vehicle-efficiency-press-statement>.

4 “Description of Fuel consumption limits for heavy-duty commercial vehicles,” April 2016, China Automotive Technology and Research Center, <http://www.catarc.org.cn/Upload/file/bzyj/PDF/zhengqiyujian-sc32-5-bzsm.pdf>.

5 Ben Sharpe and Rachel Muncrief, “Literature review: Real-world fuel consumption of heavy-duty vehicles in the United States, China, and The European Union,” January 2015, The International Council on Clean Transportation, http://www.theicct.org/sites/default/files/publications/ICCT_HDV_FC_lit-review_20150209.pdf.

6 Based on 2014 POLK registration data of vehicles with gross vehicle weight over the U.S. equivalent Class 3 (4,536 kg).

7 “GB/T 27840-2011: Fuel consumption test methods for heavy-duty commercial vehicles,” December 2011, Standardization Administration of China, <http://xmecc.xsme.gov.cn/ufile/GBT27840-2011.pdf>.

dynamometer testing results and type-approval data of new models. In total, CATARC gathered fuel consumption data from chassis dynamometer testing from 3870 models across five vehicle segments. The share of each segment is shown in Figure 2.

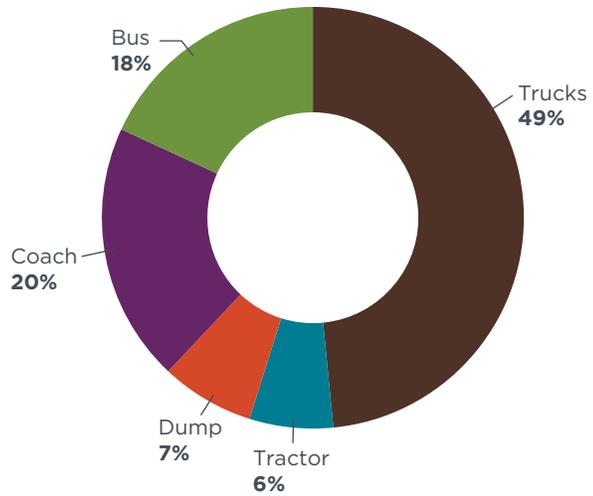


Figure 2. Share of CATARC test vehicle data for developing this standard, by vehicle segment.

Figures 3, 4, and 5 show Stage 2 and Stage 3 fuel consumption limits for tractors, straight trucks (rigid and dump trucks), and buses (transit and coach). There are 8 to 12 vehicle weight bins per segment. The testing is performed at gross vehicle weight for straight trucks and buses, and at gross combination weight for tractors.

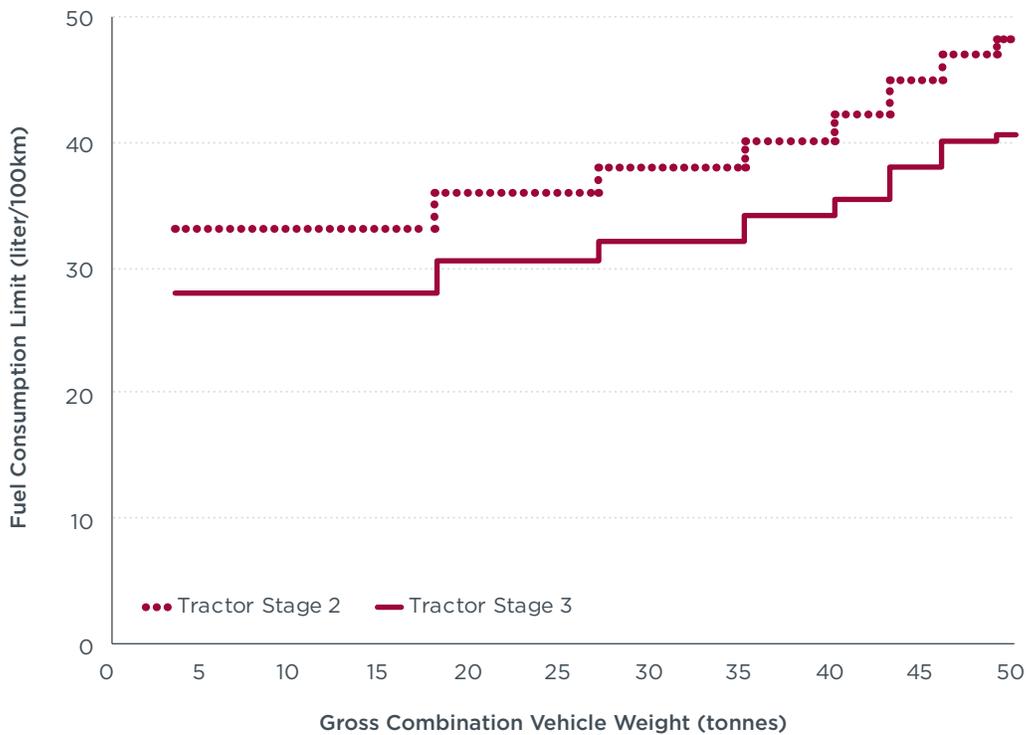


Figure 3. Tractor fuel consumption limits stipulated in the Stage 3 China fuel consumption standard for new commercial heavy-duty vehicles.

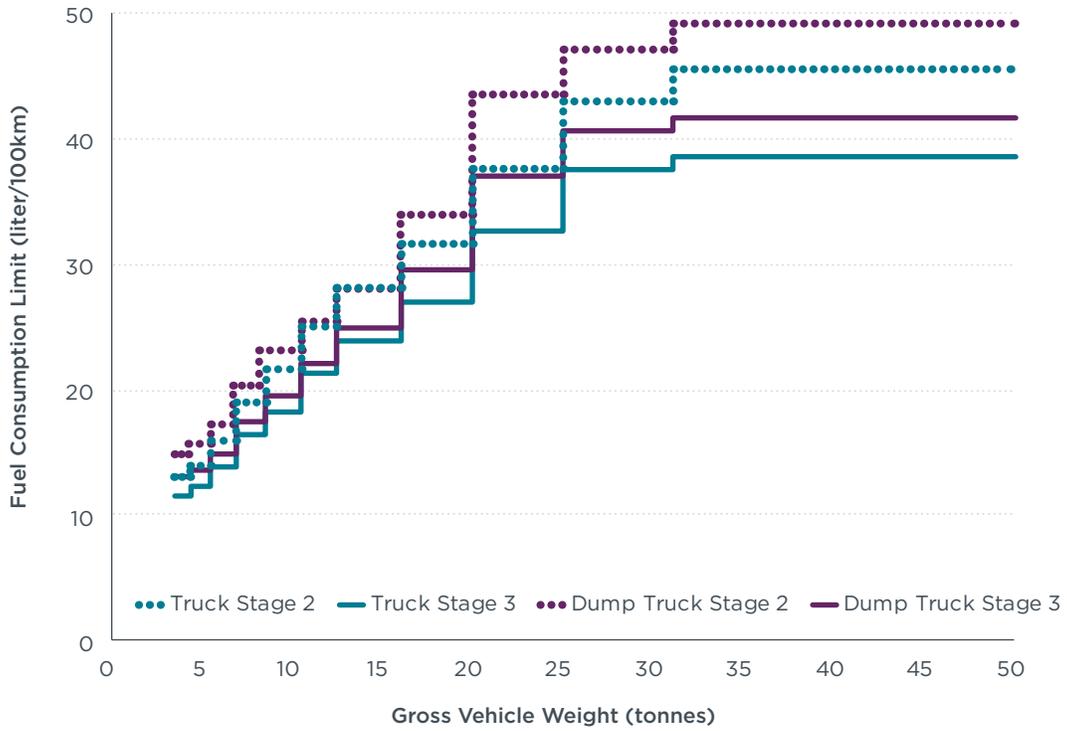


Figure 4. Straight truck fuel consumption limits stipulated in the Stage 3 China fuel consumption standard for new commercial heavy-duty vehicles.

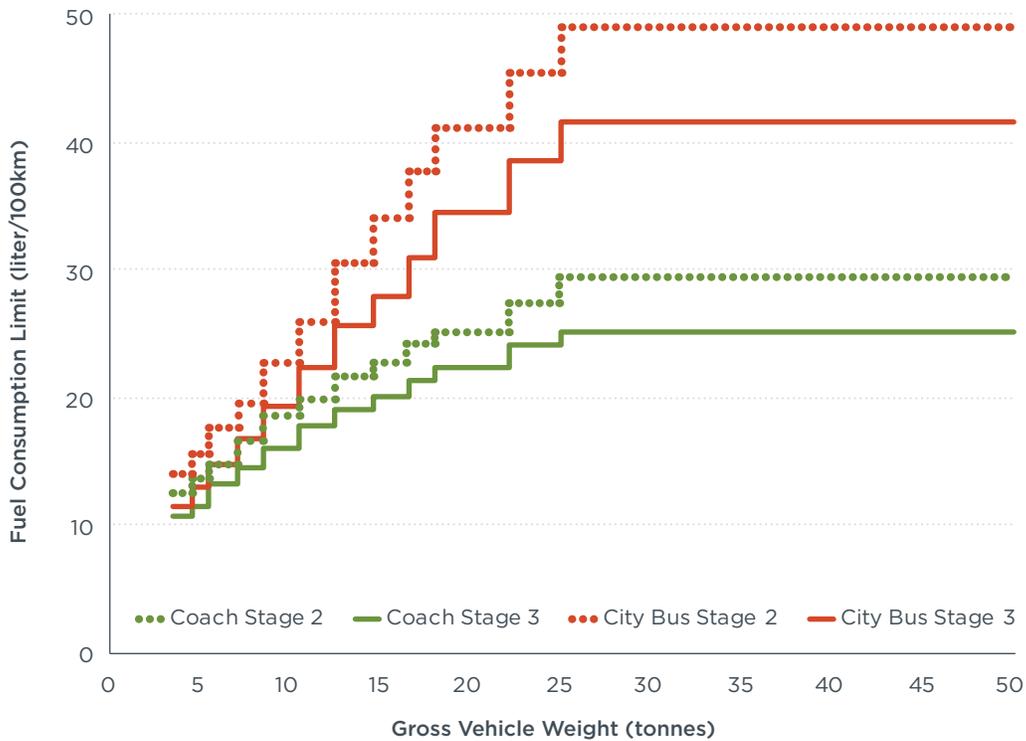


Figure 5. Bus fuel consumption limits stipulated in the Stage 3 China fuel consumption standard for new commercial heavy-duty vehicles.

STRINGENCY OF STAGE 3

Table 1 summarizes the stringency of fuel consumption by segments, and Figures 3, 4, and 5 also show the stringency of the Stage 3 standard compared with Stage 2. Key points are:

1. Similar to the Stage 2 National Standard, the Stage 3 standard sets fuel consumption limits following a step function, using gross vehicle weight to segment each vehicle type.
2. The Stage 3 standard tightens vehicle consumption limits for tractors, trucks, dump trucks, coaches, and city buses by an average of 12.5% to 15.9%.
3. The Stage 3 standard tightens vehicle consumption limits for tractors, trucks, and coaches by an average of 21.7% to 27.2% when using the Stage 1 limits as the baseline.
4. Comparing Stage 2 and 3 standards, the largest percent reduction comes from city buses with GVW 3.5-4.5 tonnes, tightened by 17.9%, and the smallest percent reduction comes from coach buses with GVW 14.5-16.5 tonnes, tightened by 10.7%.

Table 1. Stringency of fuel consumption by segment.⁸

Vehicle Type	Stage 1 -> Stage 2	Stage 2 -> Stage 3	Stage 1 -> Stage 3
Tractor	14.0%	15.3%	27.2%
Truck	11.5%	13.8%	23.7%
Coach	10.5%	12.5%	21.7%
Dump Truck	N/A	14.1%	14.1%
City Bus	N/A	15.9%	15.9%

CONFORMITY OF PRODUCTION

The compliance margin of Stage 3 is the same as in the previous two stages. That is, production vehicles are considered in compliance if conformity of production test results are less than or equal to 6% compared with their certified levels.

NEXT STEPS

The draft rule was released for public comment from April 28, 2016 to June 10, 2016. Subsequent steps in finalizing the regulation had not been announced as of July 1, 2016.

Setting fuel consumption limits for HDVs is an important, but not the only, measure for saving fuel. This regulation will be implemented together with some other measures, such as optimizing logistics and driving training.

⁸ Stringency is calculated by averaging the tightening percentage of fuel consumption limits between two stages.