

## **National legislation for retrofit of HDV for reduced emissions**

### **Introduction**

From the 1 of August 2012 an amendment to the national legislation on national type approval of systems and separate technical units enters into force in Sweden.

The amendment introduces the possibility for national type approval of retrofit emission control system. A type approved retrofit system can be used on HDV for reduced emissions.

The national legislation with technical requirement for vehicles is amended with provisions that enables the use of national type approved retrofit systems on HDV vehicles. The use of these type approved retrofit systems is limited to vehicles designed and approved up to the euro III emission standard. Vehicles designed and approved for higher emissions standards cannot use retrofit system approved according to this legislation. If there are interest for retrofit of vehicles with higher emissions standards, Sweden will adopt the regulation developed by the informal working group REC when this regulation is finished.

A vehicle with an installed type approved retrofit system will not change the emission standard for that vehicle. For example if a vehicle with a euro III engine is retrofitted with a type approved system, the emissions from the engine can be considered as equivalent with the emissions from a euro V engine. The retrofitted vehicle will still be a euro III vehicle but with reduced emissions. This information will be added to the vehicle registry.

So far we have received a number of applications for type approval, and some have already been granted.

### **Requirement on retrofit emission system**

The base legislation for national type approval of systems and separate technical units is amended with an annex containing the technical requirement for a retrofit system. From the base regulation the administrative procedure for an application of a type approval is regulated.

If an approval shall be granted the retrofit system must comply with requirements for reduction ratio. For particles, the system shall be capable of reducing the emissions by 95 percent and for NO<sub>x</sub> emissions the system shall be capable of reducing the emissions by 75 percent if the system is designed for an engine of emission standard euro II or older. The system shall reduce particle emissions with 90 percent and reduce NO<sub>x</sub> emissions with 70 percent if the system is designed for a euro III engine. The reduction ratio is set, with a margin, based on the difference between euro III and euro V emissions standard.

With an application for type approval the applicant needs to show that the requirements are fulfilled. This can be done with emission test of the engine on a test bench or with the engine mounted in a vehicle on a chassis dynamometer. Measurement procedure and equipment shall be the same as prescribed in regulation 49 or the European legislation for heavy duty vehicles.

The decision regarding what drive cycle the test should be performed with is based on the application the retrofit system is designed for after discussion between the applicant and the type approval authority in Sweden.

The retrofit system shall include an indicator on the dashboard in front of the driver. This indicator shall indicate if there are faults in the system. The indicator shall also indicate if the reduction ratio for NO<sub>x</sub> is below 50 percent when the exhaust temperature is high enough for the system to work. If the system uses

a reagent for its function, there shall also be a monitoring of the level in the reagent tank. If the level is below 10 percent the driver shall be informed about this.

There is also a requirement for durability test, that is an in-service test that needs to be performed. We have not specified in detail how this in-service test shall be performed. The applicant shall describe this in the application. One alternative for the in-service test is onboard measurement with PEMS.

There is a requirement to report a new limit value for the smoke opacity test. Since the particle emissions are decreased, the limit value for the smoke opacity test at the road worthiness check should be lower.

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