



Emission-related installation instructions

**Industrial engines
DC9, DC13, DC16
certified according to Tier 4 Final**



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Emission-related instructions in this Installation manual

The emission-related instructions of this Installation manual only apply to engines certified in accordance with Tier 4. In addition to this chapter, emission-related instructions can mainly be found in the following parts of this Installation manual:

- 01:02: Intake system and ventilation
- 01:04: Exhaust system
- 01:07: SCR system

Failing to follow these instructions when installing a certified engine in a piece of nonroad equipment violates federal law (40 CFR 1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.

Sampling of exhaust emissions



REQUIREMENT!

To enable sampling of exhaust emissions after the engine is installed in the equipment and placed in service, leave a free space of 20 cm after the exhaust pipe outlet.



Labeling requirements

Attaching a duplicate emission control information label

If you install the engine in a way that makes the engine's emission control information label hard to read during normal engine maintenance, you must place a duplicate label on the equipment, as described in 40 CFR 1068.105:

If you obscure the engine's label, you must do four things to avoid violating § 1068.101(a)(1):

1. Send a request for duplicate labels in writing on your company's letterhead to the engine manufacturer. Include the following information in your request:
 - a) Identify the type of equipment and the specific engine and equipment models needing duplicate labels.
 - b) Identify the family (from the original engine label).
 - c) State the reason that you need a duplicate label for each equipment model.
 - d) Identify the number of duplicate labels you will need.
2. Permanently attach the duplicate label to your equipment by securing it to a part needed for normal operation and not normally requiring replacement. Make sure an average person can easily read it.
3. Destroy any unused duplicate labels if you find that you will not need them.
4. Keep the following records for at least eight years after the end of the model year identified on the engine label:
 - a) Keep a copy of your written request.
 - b) Keep drawings or descriptions that show how you apply the duplicate labels to your equipment.
 - c) Maintain a count of those duplicate labels you use and those you destroy.



Label for the fuel inlet

Scania supplies the label “Ultra Low Sulfur Fuel Only” with all industrial engines.



REQUIREMENT!

By law, this label must be affixed at the filler cap on all engines certified in accordance with Tier 4.

ULTRA LOW SULFUR
FUEL ONLY

EU: 10ppm Sulfur Maximum

USA: 15ppm Sulfur Maximum

Label for the fuel inlet

338 656

Cooling capacity requirements

The following requirements apply to all engines certified according to Tier 4 Final.



REQUIREMENT!

The engine must have a cooling capacity sufficient for running at continuous full load at an ambient temperature of minimally 40°C. During such operating conditions, the coolant temperature must not exceed 108°C with full EGR and a normal coolant system degradation, e.g. from dirt.

DC16 085A, certified configuration

A Scania engine that is certified in a regulatory power category greater than 560 kW, i.e. DC16 085A, may under no circumstances be permanently constrained to a maximum power level below 560 kW.

DC16 085A is an all-speed engine. For the emission certificate to be valid, it must not be used in a generator set.



Equipment-Based Constraints

Equipment manufacturers are prohibited from constraining the engine to operate permanently at speed and load points outside of the NTE (Not-to-Exceed) control area for the engine's broadest certified torque curve. Otherwise, the constraints are considered to be tampering according to the Clean Air Act.

The definition of the NTE (Not-to-Exceed) control area is illustrated by the fundamental graph to the right and explained below.

Not-To-Exceed Area

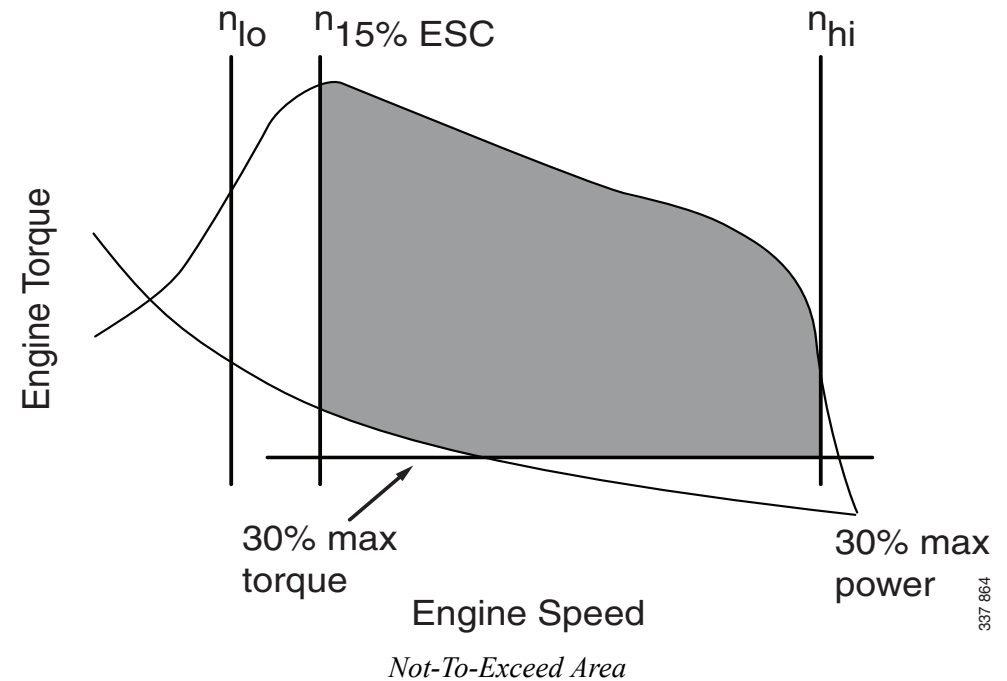
The Not-to-Exceed Area can be defined as follows:

- All engine load points greater than or equal to 30% or more of the maximum torque value produced by the engine.
- All speed and load points where the power produced by the engine is less than 30% of the maximum power produced by the engine are excluded.
- Operating speeds between $n_{15\%}$ and n_{hi} . Typical value for $n_{15\%}$ is 1,280 rpm, and for n_{hi} 2,160 rpm on a Scania Engine with a rated speed of 2,100 rpm. To determine exact speed limits, use the following formula:

n_{hi} = The highest engine speed on the power curve, where 70% of the maximum engine power is still achievable.

n_{lo} = The lowest engine speed on the power curve where 50% of the maximum engine power is still achievable.

$$n_{15\%} = (n_{hi} - n_{lo}) \times 0.15 + n_{lo}$$





Required Warning Lamps

Engines which are certified according to Tier 4 should have warning lamps for

- low reductant level,
- fault in the SCR system,
- engine malfunction.

These warning lamps must be installed correctly in the vehicle or machine.

Warning lamps for low reductant level and fault in the SCR system

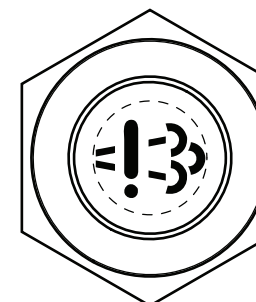
These are warning lamps for emission-related faults which will lead to inducement or severe inducement if not addressed. They are described in the section Warnings and torque reduction in installation manual 01:07 - SCR system.

The warning lamps can be ordered via Scania and also accompany the Scania EMS display. If you neither use Scania warning lamps nor the Scania EMS display, the lamps you use must have the same functionality and symbols.

The CAN messages for low reductant level and fault in the SCR system are described in the DLN8 section of installation manual 03:05 - CAN interface.



Warning lamp for low reductant level



Warning lamp for fault in the SCR system

340 445

340 423



Warning lamps for engine malfunction

In case of other emission-related failures, either of these two methods of visualizing this should be applied:

1. Visualizing CAN messages in your own user interface

1.1 Engine Malfunction Visual Signal

In your own user interface, you can visualize the Engine Malfunction Visual Signal, which includes the two CAN messages Amber Warning Lamp Status and Red Stop Lamp Status.

Note:

The Engine Malfunction Visual Signal is the option recommended by Scania, since this is the only option that provides information on the severity of the warnings, according to the description below.

- The Amber Warning Lamp indicates that the operator should contact a workshop. It is activated in case of emission-related faults and other faults which might entail a high reparation cost.
- The Red Stop Lamp represents an urgent request to initiate a controlled shut-down immediately, due to severe risk of personal injury or extremely high reparation cost.

Below are some examples of typical faults that light the Amber Warning Lamp:

- Sensor or actuator signal lost.
- Engine or after treatment system temperature close to hardware limits.
- System battery voltage out of normal range.
- Failed plausibility test on e.g.
 - NOx sensor
 - Boost pressure
 - EGR actuator



- Adaption out of limits.

Below are some examples of typical faults that light the Red Stop Lamp:

- Long time loss of oil pressure.
- Internal EMS software error.
- Excessively high battery voltage.
- Severe engine overspeed.
- Severe fuel system failure.

The CAN messages Amber Warning Lamp Status and Red Stop Lamp Status are described in the DM1 EMS section of installation manual 03:05 – CAN interface.

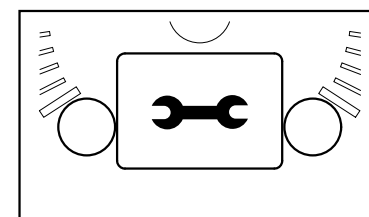
1.2 Test Engine Lamp

In your own user interface, you can also visualize the CAN message Test Engine Lamp. This signal constitutes the sum of Amber Warning Lamp and Red Stop Lamp.

The CAN message Test Engine Lamp is described in the DLN2-Proprietary section of installation manual 03:05 – CAN interface.

2. Using Scania instrumentation

If you have chosen to buy Scania instrumentation, the CAN message Test Engine Lamp will switch on a warning lamp in the form of an adjustable spanner.



The Test Engine Lamp in Scania instrumentation