

**VEHICLE STANDARD (AUSTRALIAN DESIGN RULE 80/02
— EMISSION CONTROL FOR HEAVY VEHICLES) 2006**

APPENDIX D

**Japanese Ministry of Land, Infrastructure and Transport
Technical Guideline for Urea Selective Catalytic Reduction System
No. 105 of 14 September 2004**

(Edited translation for the purposes of this vehicle standard)

1 Scope

This technical guideline applies to diesel vehicles with gross vehicle weight of 3.5 tonnes or more equipped with urea selective catalyst reduction system (hereinafter called SCR).

2 Urea Solution Standard

Urea solution used for the SCR system on the vehicle should conform to DIN V70070 Dieselmotoren-NO_x-Reduktionsmittel AUS32-Anforderungen und Pruefverfahren.

3 Construction Requirements

- 3.1 The SCR system on the vehicle shall be designed to:
- 3.1.1 keep the temperature of the urea solution liquid at low atmospheric temperature in order to prevent phase separation;
 - 3.1.2 prevent urea from staying at the injection nozzle when the engine stops in order to prevent phase separation;
 - 3.1.3 prevent high urea solution temperatures by adopting shields or other measures in order to maintain the quality of the urea solution in the tank;
 - 3.1.4 provide a pressure regulator in urea solution tank in order to prevent excessively high pressures in the tank;
 - 3.1.5 prevent urea solution from freezing while the engine is running in order to secure proper injection rates for the urea solution; and
 - 3.1.6 use parts which are durable and resist corrosion by the urea solution and other material.

- 3.2 In order to keep the emission of ammonia as low as possible, a vehicle equipped with an SCR system shall:
- 3.2.1 be fitted with oxidation catalyst downstream of the SCR system, which has enough oxidation capability to keep emissions of ammonia as low as possible; and
- 3.2.2 utilise a pressure regulator in the urea tank which incorporates a mechanism to keep emissions of ammonia as low as possible.
- 3.3 A vehicle equipped with an SCR system should be provided with a meter, which indicates the balance of urea solution in the tank so that the driver is able to refill properly.
- 3.4 Any catalyst used as part of, or in conjunction with, an SCR system must not emit any of the following metals into the atmosphere:
- Vanadium
 - Chromium
 - Manganese
 - Cobalt
 - Nickel
 - Copper

4 Cautions and Warnings

4.1 Cautions

A vehicle equipped with an SCR system should be provided with caution lamps, which shall engage and inform the driver to take corrective measures when the following conditions are detected:

- 4.1.1 the urea solution injection rate is incorrect;
- 4.1.2 the level of urea solution in the tank falls below the level required for 300km of normal operation; or
- 4.1.3 the urea solution is of abnormal quality (not meeting the requirements of clause 2).

4.2 Warnings

An additional warning lamp and an audible warning (buzzer) shall be activated under the following conditions:

- 4.2.1 where no corrective action is taken within 300km after the first caution lamp is engaged under clause 4.1 in response to the detection of the conditions of clause 4.1.1;
- 4.2.2 where no corrective action is taken within 300km after the first caution lamp is engaged under clause 4.1 in response to the detection of the conditions of clause 4.1.3; or
- 4.2.3 where the tank containing the urea solution is empty.
- 4.3 The onboard diagnostics system of the vehicle shall record a fault code when any of the conditions of clause 4.2 are met.
- 4.4 All caution and warning lamps shall be clearly visible from the driver's seating position.

- 4.5 The vehicle shall be able to confirm that the SCR system is operating normally, prior to the start of driving.
- 4.6 The reason for the triggering of the different caution and warning lamps shall be clear to the driver.

5 Restriction and recovery

- 5.1 Subject to clause 5.2, where no corrective action is taken following the detection of conditions under clause 4.1.2 or 4.1.3, and the triggering of the warning lamp and buzzer under clause 4.2.2 or 4.2.3 subsequently occurs, the vehicle shall be constructed so that engine is unable to re-start after the engine is stopped by the key being switched to the 'ACC' or 'OFF' position.
- 5.2 The vehicle shall allow the engine to re-start if the engine stops when the key is in the 'ON' position.
- 5.3 The vehicle shall be constructed so that caution and warning systems are disengaged once the appropriate corrective action is taken.
- 5.4 After being stopped under clause 5.1, the engine shall be able to be re-started once the tank has been refilled with a quantity of urea solution meeting the requirements of clause 2 sufficient for vehicle operation of more than 300 km.

6 Notice to driver

- 6.1 The vehicle manufacturer shall include instructions regarding the following items in the vehicle's operation manual:
- (a) an explanation of the warning lamps and buzzer, including their meaning;
 - (b) an explanation of the conditions under which the engine is unable to start again after caution is made;
 - (c) a description of the measures operators must take when engine is unable to be re-started;
 - (d) the need to maintain supply of urea solution;
 - (e) the quality standards for urea solution;
 - (f) storage of urea solution; and
 - (g) other relevant operational matters.
- 6.2 Items (a) and (b) must also be detailed in caution labels which should be affixed in a position that is clearly visible to the driver.