



Tier 5 Rulemaking: Selective Catalytic Reduction (SCR) Inducement Concept

June 27, 2023

Outline

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Inducement Background

- Current SCR inducement:
 - Maintain a sufficient supply of Diesel Exhaust Fluid (DEF)
 - Prevent engine operation without DEF
 - Maintain high-quality DEF
 - Prevent the use of poor-quality DEF by setting concentration specifications
 - Discourage tampering of the SCR aftertreatment system
 - Ensure the integrity of the SCR system, prevent any unauthorized modifications or tampering
 - Reduce the available torque to give operator an incentive to rectify a problem that would prevent the SCR from operating properly

SCR Inducement Concept

- Align with the existing inducement provisions for new off-road compression ignition engines to provide clarity to engine OEMs and consistency to operators.
 - The existing SCR inducement for off-road compression ignition engines are established in the EPA letter “CD-14-10 (HDNR)” dated May 12, 2014, and guidance from a collaborative public workshop conducted in July 2010 by the U.S. EPA and CARB.
 - Emergency override provisions in 40 CFR 1039.665.
- Maintain inducements for:
 - DEF Level
 - DEF Quantity
 - Tampering
- Encourage operators to take the necessary measures to ensure proper functioning of the SCR system.
- At present, we are considering inducements for SCR only.
 - Other emission control systems may be independently monitored for performance.

SCR Inducement Applicability

The SCR inducement applies to all new electronically controlled off-road compression ignition engines of all power categories that

- Utilize an SCR system for model year 2029 and later

SCR Inducement Schedule

	Monitoring Items	Failure Consequences	Warning/Inducement Activation
SCR	DEF Level	Fault Detection (warning activation)	≤15% Tank Capacity
		Initial Inducement Activation (25% Torque Reduction)	≤10% Tank Capacity
		Severe Inducement Activation (40%-60% Torque reduction)*	≤5% Tank Capacity
		Final Inducement Activation (Idle or engine shutdown)	Empty Tank
	DEF Quality Tampering	Fault Detection (warning activation)	Within 1 hour (hr) of engine operation
		Initial Inducement Activation (25% Torque Reduction)	Immediately on warning activation
		Severe Inducement Activation (40%-60% Torque reduction)*	1hr after warning activation
		Final Inducement Activation (Idle or engine shutdown)	4hrs after warning activation

SCR Inducement General Criteria

	Tier 5 Concepts
Self-Healing	System should be able to restart after action that triggers inducement is corrected.
Generic Scan Tool	Use of generic scan tool to clear inducement not allowed. Factory or dealership tools are required.
Repeat Offense	Detect within 40hrs of engine operation. Any second offense results in returning to final inducement within 60 minutes.
Safe Harbor Triggers	The final inducement is triggered once two of the following occurs: Refueling Parked/Idled Engine Restarted
Freeze Protection	Show that system is capable of dosing within 40 minutes. Reductant won't refreeze during operation.
Inducements/ Engine Derates Fault Codes	Codes should be displayed in the cab or with a generic scan tool.

Request for Feedback

- Staff request comments regarding the SCR inducement concepts

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