



# **Tier 5 Rulemaking: Useful Life and Warranty Concepts**

June 27, 2023

# Outline

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- Defect Investigation, Reporting, and Corrective Action Concept
- Useful Life (UL) and Warranty (W) Concept
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# Background: Current Investigation, Reporting, and Corrective Action Requirements

- **Defect Investigation:** If the number of unscreened W claims indicate that an emissions-related component may have an issue, manufacturers must investigate to determine if the emission-related component is defective by examining W claims, conducting in-use testing, reviewing consumer complaints, etc.
- **Defect Report:** If the investigation shows that the emission-related part is defective, manufacturers must submit a defect report which contains information regarding the nature of the defect, how widespread the defect is, how the defect will impact emissions, and how the manufacturer will address the defect.
- **Corrective Action:** Current regulatory text requires any emission-related component of an engine family that has a failure rate exceeding four percent or 50 failures, whichever is greater, shall be subject to recall, unless the Executive Officer determines that a recall is unnecessary.\*
  - CARB's current policy is to allow manufacturers to issue extended warranties instead of performing recalls for certain components.

# Tier 5 Corrective Action Concept

The Tier 5 concept codifies policy by identifying which components would be subject to recall or extended W:

- Recall for failures of exhaust after-treatment devices, on-board computers or systems, urea dosers, and hydrocarbon injectors.
- Extended W to full UL for other components.
- Executive Officer has the flexibility to determine whether a recall is necessary.\*

\* Title 13, California Code of Regulations, § 2148

# Defect Investigation, Reporting, and Corrective Action Thresholds

Current:

Engine power	Investigation (Nationwide number; Unscreened defect)	Defect Reporting (Nationwide number; Screened defect)	Corrective Action (California number; Screened defect)
kW ≤ 560	50 or 10% (whichever is greater) <sup>a,b</sup>	20 or 2% (whichever is greater) <sup>c,d</sup>	50 or 4% (whichever is greater) <sup>e</sup>
560 < kW	25 or 10% (whichever is greater) <sup>a,b</sup>	10 if sales is less than 150 15 if sales is 150-750 2% if sales is 750+	50 or 4% (whichever is greater) <sup>e</sup>

Tier 5 Concept:

Engine power	Investigation (California number; Unscreened defect)	Defect Reporting (California number; Screened defect)	Corrective Action (California number; Screened defect)
All kW	12 or 10% (whichever is greater)	12 or 4% (whichever is greater)	12 or 4% (whichever is greater)

kW: Kilowatt

a: 5,000 if engine family sales is more than 50,000, b: Title 40, Code of Federal Regulations, § 1068.501(e)

c: 1,000 if engine family sales is more than 50,000, d: Title 40, Code of Federal Regulations, § 1068.501(f)

e: Title 13, California Code of Regulations, § 2143

# Rationale for Tier 5 Defect Investigation, Reporting, and Corrective Action Concept

- For a California only Tier 5 program, investigation thresholds need to be lowered to reflect lower sales numbers to maintain the capability of identifying potential defects in most engine families.
- Corrective action threshold with absolute number (50) needs to be lowered because staff's analysis suggested nearly half of engine families would be effectively exempted without lowering the threshold.\*
  - Details of staff analyses based on California sales numbers are not shown here to protect confidential business information.

\* Based on model year 2020 California sales numbers reported by manufacturers

# UL Background

- Manufacturers must certify that their engines will comply with applicable emission standards throughout the UL.
- The UL of off-road engines  $\geq 37\text{kW}$  is 8,000 hours or 10 years.
- In the Nov. 2021 workshop, CARB staff asked for feedback for potentially extending the UL to 12,000 hours. Feedback/data provided:
  - Low-usage equipment (especially seasonal agriculture usage) will not reach UL hours.
  - Equipment life can be shorter than engine's life.
  - Longer UL exacerbates the aftertreatment system packaging challenge.

# Emission W Background

- Manufacturers shall warrant to the purchaser that the engine is free from defects which cause the failure of a warranted part to be identical in all material respects to the part as described in the engine manufacturer's application for certification.
- The W of off-road engines  $\geq 37\text{kW}$  is 3,000 hours or five years.
- Manufacturers are required to track the information on possible defects and submit reports.



# Staff's Analysis of UL

- New data from CARB's contractor showed that the average life of engines in construction and agriculture sectors is approximately **10,000 hours/18 years**.
  - In 10 years, average equipment only reaches ~5,600 hours whereas UL is 8,000 hours.
  - In 15 years, average equipment fully utilizes 8,000-hour UL.
- Longer UL hours would not benefit...
  - Seasonal operation/low-usage equipment
  - Short-lived equipment (equipment life < engine life)
- Therefore, staff plans to **maintain the current UL hour limits but extend the year limits by ~50 percent**.

# Staff's Analysis of W

- Available data suggest most of off-road equipment reach the year limit of W periods before reaching the hour limit.
- Recent surveys to original equipment manufacturers conducted by 44 Energy suggested that the cost impact of lengthening only the year limits in UL and W would be small.
- Our concept is **to keep hours the same but lengthen years by ~50 percent for both UL and W and all power categories.**
- 1<sup>st</sup> time off-road on-board diagnostics/on-board monitoring requirement will encourage more owners to fix malfunctioning parts within W period.

# Tier 5 UL/W Concept

Power	Constant speed		Variable speed
kW < 19	UL: 3,000 hours/5 years → 8 years W: 1,500 hours/2 years → 3 years		
19 ≤ kW < 37	RPM ≥ 3,000 UL: 3,000 hours/5 years → 8 years W: 1,500 hours/2 years → 3 years	RPM < 3,000 UL: 5,000 hours/7 years → 11 years W: 3,000 hours/5 years → 8 years	Any speed UL: 5,000 hours/7 years → 11 years W: 3,000 hours/5 years → 8 years
kW ≥ 37	UL: 8,000 hours/10 years → 15 years W: 3,000 hours/5 years → 8 years		

- No change in the hour limits.
- The number of years are increased by 50 percent and rounded up to the nearest integer.
- UL will also apply to CARB's in-use compliance testing and manufacturer-run in-use testing.

**Staff requests feedback on UL/W periods**

# Request for Feedback

We request feedback regarding the following:

- Potential thresholds for defect investigation, reporting, and corrective action thresholds.
- Requirement for corrective action regarding which components would be subject to recall or extended W.
- UL and W periods.