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A/37696/Gen/Pol/E2W (PPC)

Jun 2022

List 'A' and 'B'
(Through MES website)

29

**ADVISORY : RETROFITTING OF EMISSION
CONTROL DEVICES (RECD) ON GEN SETS**

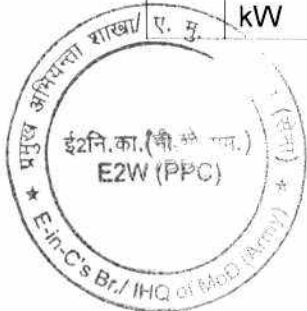
Introduction

1. To achieve Sustainable Development Goal 11 for sustainable cities and communities (**Flag B**), there is requirement to reduce Air Pollution and Green House Gases effect. Government of India, Ministry of Environment (MoEF & CC) has launched the National Clean Air Programme (NCAP) for prevention, control and abatement of air pollution levels in the Country at an urban and regional level. DG Sets are a major source of pollution contributing upto 18% of total air pollution (already operational DG Sets). To counter this, the National Clean Air Programme (NCAP) document provides following options: -

- (a) Use of Retrofitted Emission Control Equipment / Devices (RECD) having a minimum specified Particulate Matter (PM) capturing efficiency of 70%, type approved by one of the five Central Pollution Control Board (CPCB) recognized labs.
- (b) Shifting to gas-based generators by employing new gas-based generators or retrofitting existing DG Sets for partial gas usage.

2. In order to comply with CPCB guidelines (Nodal Agency of Government of India), instructions were issued vide this HQ letter No. 62888/Gen-Misc-2/E4 (U-4) dated 21 Oct 2021. The emission limits for DG sets up to 800 kW as per CPCB-II norms are reproduced below: -

Ser No	Power Category	Emission Limits(g/kW-hr)			Smoke Limit (Light Absorption Coefficient, m ⁻¹)
		NOx+ HC	CO	PM 2.5	
(a)	Upto 19 kW	≤7.5	≤3.5	≤0.3	≤0.7
(b)	More than 19 kW upto 75 kW	≤4.7	≤3.5	≤0.3	≤0.7
(c)	More than 75 kW upto 800 kW	≤4.0	≤3.5	≤0.2	≤0.7



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Notes: -

1. The abbreviations used in Table shall mean as under:-
 - (a) NO_x - Oxides of Nitrogen
 - (b) HC - Hydrocarbon
 - (c) CO - Carbon Monoxide
 - (d) PM 2.5 - Particulate Matter.
2. Smoke shall not exceed above value throughout the operating load points of the test cycle.
3. CPCB has now issued "System & Procedure for testing of Retrofit Emission Control Devices" dated 01 Feb 2022 with objective of PM 2.5 reduction of in-use DG Sets upto 800 kW vide PCLS/12/2021-22 Pollution Control Series, subject to further revision, if any, by CPCB.
4. **Aim.** The aim of this advisory is to lay down guidelines for applicability, requirements of system and procedure for PM reduction by using retrofitted emission control devices (RECD) for in-use diesel operated internal combustion engines up to 800 kW gross mechanical power for generator set (Gen Set) application, as per CPCB instructions. The engines with power above 800 kW are also required to install RECD to achieve CPCB-II norms, in case the DG Sets are not meeting CPCB II norm.

Scope**5. CPCB Instructions for Installation of RECD.**

(a)	DG Sets Manufactured / Installed before 01 Jul 2004 and DG Set which are not complying either Stage-I and /or Stage-II emission limits	Engines are to be scrapped if not complying with Stage II norms even after fitment of RECD.
(b)	Phase I Engines. DG Sets manufactured / imported after 01 Jul 2004 till 01 Jul 2014	Shall establish the compliance of minimum 70% reduction of Particulate Matter by using the retro-fitted after treatment devices (RECD) without adversely affecting any other emission parameters.
(c)	Phase II Engines. Engines DG Sets manufactured / imported on or after 01 Jul 2014	Shall establish the compliance of minimum 70% reduction of Particulate Matter by using the retro-fitted after treatment devices (RECD) without adversely affecting any other emission parameters.



6. The cost benefit analysis for installation of RECD devices has to be carried out before fixing RECD in any DG Set based on end of life of DG Set vis-à-vis cost of RECD and running of DG Set. It should be based on the usage, running hours, criticality of DG set etc. DG sets for hospitals, lifts, fire fighting, water supply, signal installations and critical applications are to be provided with RECD. However for non-critical loads, the use of DG sets needs to be curtailed. After detailed analysis and considering station requirements and criticality of application, necessary works may be sanctioned for installation of RECD in DG Sets through staff channel.

Durability Period and Fixed Deterioration Factor Requirement

7. Durability requirement shall be applicable to the RECD as per following power category: -

(a) Durability Period (Expected Life) of RECD fitted on the DG engines manufactured / imported between 01 Jul 2007 to 01 Jul 2014.

Category (Power Band)	Emission Durability Period
Up to 800 kW	4000 hours or 6 years whichever is earlier

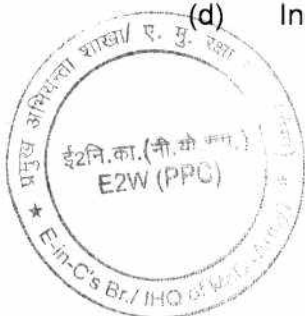
(b) Durability Period of RECD fitted on the DG engines manufactured/ imported after 01 Jul 2014.

Category (Power Band)	Emission Durability Period
Up to 75 kW	4000 hours or 6 years whichever is earlier
>75kW ≤ 800kW	6000 hours or 6 years whichever is earlier

8. Annual depreciation percentage of DG Sets is stipulated in E-in-C's Branch letter No A/37696/12-126/Pol/E2W (PPC) dated 18 Apr 2017 is 5%. However it should be read in conjunction with CPCB instruction of 01 Feb 2022. The comprehensive maintenance of RECD alongwith generation of regular test report of emission standards shall also be included with the maintenance of DG Sets.

9. **Testing.** The RECD must be tested by one of the five currently CPCB recognised/ approved labs: -

- Automotive Research Association of India, Pune (Maharashtra).
- International Centre for Automotive Technology, Manesar (Haryana).
- Indian Oil Corporation, Research and Development Centre, Faridabad (Haryana).
- Indian Institute of Petroleum, Dehradun (Uttarakhand).



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(e) Vehicle Research Development Establishment, Ahmednagar (Maharashtra).

Note. If additional Labs are approved, the same will be intimated.

10. RECD are manufactured using various technologies such as Wet Scrubber, Electrostatic Precipitator (ESP) and Catalytic Conversion. The output result of the RECD should be as per CPCB II norms, irrespective of the manufacturers' technologies.

11. RECD shall have no effect on exhaust back pressure. The back pressure shall be maintained within prescribed limit by the manufacturer. There should not be any backflow from RECD to engine exhaust system. Type Approval of RECD for family of DG Sets should be as per CPCB instructions and the same has to be obtained from the CPCB prescribed labs as above. The RECD manufacturer shall furnish written instructions and requirements about use and maintenance of RECD system, its correct operation and maintenance, and its emission performance.

12. **RECD Type and Family.**

(a) No person or agency shall sale, import, install or use a RECD for in-use Genset application in India without valid Type Approval Certificate.

(b) In order to receive at type approval of a RECD type or RECD family, the manufacturer / importer / retrofitter shall demonstrate compliance, of the RECD type or RECD family with the provisions of the regulation.

13. **Choice of the Test Engines and RECD Combination.**

(a) The test engine shall originate from an engine emission family corresponding to subsequent application range of RECD. A duly overhauled/ serviced DG engine as per engine manufacturer's recommendation should have working performance parameters as mentioned below: -

(i) **Phase I Engine.** Emission, Smoke & PM values should not exceed 1.5 times of the CPCB Stage-1/ GSR 371 dated 17th May 2002.

(ii) **Phase II Engine.** Emission, Smoke & PM values should not exceed 1.25 times of the CPCB Stage-2/GSR 771(E) dated 11th Dec 2013 and its amendment vide GSR 232(E) dated 31 Mar 2014.

(b) The parent engine of respective family of specific engine manufacturer/ importer shall be selected for emissions & PM measurement.

(c) For Class I and Class II RECD, when combined with the selected test engine the RECD should have highest space velocity or exhaust mass flow rate, as may be applicable within the application range of the RECD family.



(d) The RECD shall have minimum volumetric concentration of catalytically active materials specified by the manufacturer for the RECD family.

(e) When the requirement of sub-paragraph 12(c) and sub-paragraph 12(d), above, are mutually incompatible, the requirement of sub-paragraph (c) shall take priority.


(f) The selected test engine shall comply in both series production condition and in retrofitted condition with all of the pollutant emissions limits associated with the stage or standard to which it was originally type-approved. Where DG Set are fitted with on-board diagnostic systems, those systems shall not be affected with respect to their monitoring function after the retrofit system has been installed. The characteristics of the electronic engine control unit (as regards, for example, injection timing, air-mass flow metering or exhaust emissions reduction strategies) shall not be altered by the retrofitting. Any modification of the test engine that changes the original emission behaviour (for example alternation of the injection timing) is not permitted.

(g) Engines certified with exhaust mufflers (with or without containing after treatment element) shall be represented during type approval testing as an actual component or through back-pressure setting and such element cannot be removed from installations for actual RECD application owing to their contribution and compliance to noise certification.

14. **Subsidy.** There are certain Govt. agencies which are giving subsidy charges for fixing of RECD devices in DG Set. For example, as per J&K Government policy all new units, existing units and existing units undertaking substantial expansion will get 100% subsidy on purchase and installation of a single new DG Set, only one, having capacity ranging from 10 kW to 2000 kW. This incentive however, shall only be extended, subject to installation of RECD, as per the condition laid down for DG Sets of 125 KVA capacity and above.

15. It is reiterated that all MES formation/ units should take necessary action in accordance to Government guidelines and CPCB norms to promote sustainable development, reduction in carbon footprint, pollution control etc. resulting in mitigation of environmental concerns.

16. For information and necessary action.


(Vijay Jotwani)
Brig
DDGW (PPC & Est)
For E-in-C

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✓ Automation Cell - For uploading on MES website with restricted access.

