

EMISSION LIMITS, APPLICABILITY, TEST CYCLE AND REQUIREMENTS

"System and Procedure for compliance to revised emission standards (dated 03.11.2022) for power generating set engines (up-to gross mechanical power 800 KWs)" published by CPCB, dated 28/03/2023 for compliance to the rules vide notification no. GSR 804(E.) dated 3-Nov-2022. Emission limits for new internal combustion engine up to 800 kW gross mechanical power for generator set (Genset) application, issued by Ministry of Environment Forest and Climate Change, Government of India.

Emission of gaseous and particulate pollutants from following distinct internal combustion engines categories and fuel options operating with either constant speed duty cycle or variable speed duty cycle,

- a) Diesel engines
- b) Engine based on dedicated alternate fuels
- c) Engine based on Bi-fuel run either on Gasoline or on any one of the alternate fuels
- d) Engine based on Dual Fuel run on Diesel and any of the alternate fuels
- e) Portable Generator sets (PI engines below 19kW and up to 800 cc displacement) run on Gasoline fuel, dedicated alternate fuels and Bi-fuel run either on Gasoline or on any one of the alternate fuels

The emission limits for new engines up to 800 kW used for Genset shall be effective from 1st July, 2023 as specified in the Table 1 and Table 2 below subject to the General Conditions contained therein.

TABLE 1

Emission limits for Genset engines up to 800 kW Gross Mechanical Powered by All CI engines and PI engines > 800 cc engine displacement.

Power Category, kW	NOx	HC*/**	NOx +HC*/**	CO	PM		Smoke (light absorption coefficient)	
	CI/PI	CI/PI	CI/PI	CI/PI	CI	PI	CI	PI
	g/kWh						m-1	
$P \leq 8$	-	-	7.5	3.5	0.30	-	0.7	-
$8 < P \leq 19$	-	-	4.7	3.5	0.30	-	0.7	-
$19 < P \leq 56$	-	-	4.7	3.5	0.03	-	0.7	-
$56 < P \leq 560$	0.40	0.19	-	3.5	0.02	-	0.7	-
$560 < P \leq 800$	0.67	0.19	-	3.5	0.03	-	0.7	-

TABLE 2

Emission limits for portable Genset up to 19 kW powered by PI engines (up to 800 cc engine displacement)

Category	CO	NO _x +HC */**
Engine Displacement (cc)	g/kWh	
Up to 99	< 250	< 10
> 99 and up to 225	< 250	< 08
> 225 and upto 800	< 250	< 06

General Conditions:

1. Applicability - These General Conditions shall apply to all new engines for power generation application and products manufactured, assembled or imported to India, operating at constant or variable speed as the case may be:

Provided that these rules, shall not apply to-

- (a) engine or product, assembled or manufactured or imported, as the case may be, for the purpose of export outside India, or;
- (b) engine or product intended for the purpose of sample limited to four in number and to be exported back within six months of completing the sample testing and not for sale in India.
- (c) engine or product, assembled or manufactured or imported, as the case may be, for the purpose of research and development testing which shall be scrapped or re-exported.

2. Requirement of certification. - Domestic manufacturer, importer or assembler of engines for power generation up to 800 kW and engine displacement > 800 cc and of portable Gensets up to 19 kW and engine displacement up to 800 cc, shall obtain Type Approval from authorised certifying agency and also comply with Conformity of Production test of their product(s) for the emission limits which shall be valid for the next Conformity of Production year or the date of implementation of the revised norms specified above, whichever is earlier.

Explanation – The term Conformity of Production year covers the period from 1st July of calendar year to 30th June of the following calendar year.

3. Sale, import or use of engine or product not complying with these rules. - No person shall sell, import or use an engine and genset for power generation application which is not having a valid Type Approval certificate and certificate of Conformity of Production referred to in General Condition 2.

4. Requirement of conformance labelling shall be as mentioned in System and Procedure for Genset.

5. Nodal Agency– The Central Pollution Control Board shall be the nodal agency for implementation of these rules.

(a) In case of difficulty in implementation of these rules, the matter shall be referred to the nodal agency.

(b) shall constitute a Standing Committee to advise it related to the implementation of these rules.

6. Authorised agencies for certification. –(a) Automotive Research Association of India, Pune (Maharashtra); (b) International Centre for Automotive Technology, Manesar (Haryana); and (c) Indian Institute of Petroleum, Dehradun (Uttarakhand) are authorised to carry out or witness such tests as they may deem necessary, for giving certificates of Type Approval and Conformity of Production for engines and Gensets for power generation application.

7. Compliance and testing procedure. -

(1) the Compliance and Testing Procedure, as published by the Central Pollution Control Board shall be followed by all concerned,

(2) the authorised agencies for certification shall submit the testing and certification details in respect of the emission to the Central Pollution Control Board annually.

8. Engine components or parts identification. - All the details of engine components or parts responsible for the emission performance shall be clearly marked in English language.

9. Safety code of practices for alternate fuels shall be as defined in System and Procedure for Genset.

10. Fuel system components certification for alternate fuels shall be as defined in System and Procedure for Genset.

11. The Central Pollution Control Board, Commission for Air Quality Management, State Pollution Control Boards or Pollution Control Committee may issue more stringent norms taking account to local condition of the area.

The details are covered in next,

A1. FOR COMPRESSION IGNITION ENGINES

A2. FOR POSITIVE IGNITION ENGINES

A3. FOR PORTABLE GENERATOR SET

A1. FOR COMPRESSION IGNITION ENGINES

The emissions of the carbon monoxide, the emissions of hydrocarbons, the emissions of the oxides of nitrogen and the emissions of particulate matter and smoke obtained during emission certification and conformity of production emission test/s conducted in accord with system & procedure regulation considering applicable deterioration factor, adjustment factor, shall not exceed the amount shown Table below:

Emission limits for Genset engines up to 800 kW Powered by CI engines							
Power Category, kW	Ignition type	NOx	HC	NOx +HC	CO	PM	Smoke
		g/kWh					m⁻¹
P ≤ 8	CI	-	-	7.5	3.5	0.30	0.7
8 < P ≤ 19	CI	-	-	4.7	3.5	0.30	0.7
19 < P ≤ 56	CI	-	-	4.7	3.5	0.03	0.7
56 < P ≤ 560	CI	0.40	0.19	-	3.5	0.02	0.7
560 < P ≤ 800	CI	0.67	0.19	-	3.5	0.03	0.7

Notes:

- (a) The above limits are applicable for constant speed & variable speed engine
 - (b) Smoke shall not exceed above value mentioned in tables above (where applicable) throughout the operating load points of the test cycles.
 - (c) The testing shall be done as per test procedures mentioned in system & procedure regulation.
 - (d) Every manufacturer, importer or assembler (hereafter referred as manufacturer) of the engine for genset application manufactured or imported into India shall obtain Type Approval and comply with Conformity of Production (COP) requirements of their product(s) for emission limits which shall be valid for next COP year.
 - (e) The above-mentioned limit shall be applicable to Type approval and Conformity of Production (COP) carried out by authorized test agencies.
- The term 'COP year' means the period from 1st July of a calendar year to 30th June of the following year.
- (f) HC* - NMHC shall be considered for dual fuel operation in case of natural gas or RHC in case of LPG.

Note: THC shall be considered for dedicated diesel engines

NMHC = THC – CH₄ for natural gas dual fuel operation or NMHC = 0.3 X THC

RHC = 0.5 X THC for LPG dual fuel operation.

Speed operation	Emission Test Cycle
Constand speed engine	D2 5-mode Steady-state discrete mode test cycle specified in ISO-8178-Part 4 OR D2 5-mode Steady-state ramped mode test cycle specified in ISO-8178-Part 4
Variable speed engine	C1 8-mode Steady-state discrete mode test cycle specified in ISO-8178-Part 4 OR C1 8-mode Steady-state ramped mode test cycle specified in ISO-8178-Part 4 OR 5-mode Variable Speed Cycle as specified Appendix 9 of Annexure 7

Manufactures shall declare in TA application his choice of discrete-mode type or RMC type cycle for each family. The chosen cycle type shall also be applicable for all the child rating within family and not allowed to alter or further choice during COP. RMC type cycle is more relevant to determination the infrequent regeneration adjustment factor (IRAF) for the engine equipped with exhaust after-treatment systems that are regenerated on an infrequent (periodic) basis. Test agency may suggest RMC type cycle in case it is difficult to determine IRFA on discrete-mode type cycle for some cases

Constant Speed Test Cycle:

Table B- Discrete D2 test modes

Test modes and weighting factors					
Mode number (cycle D2)	1	2	3	4	5
Speed (a)	100%				
Torque (b) (%)	100	75	50	25	10
Weighting factor	0.05	0.25	0.3	0.3	0.1
Mode length (Second)	600	600	600	600	600

(a) Rated speeds as declared by manufactured
(b) per cent torque is relative to the torque corresponding to the rated gross power declared by the manufacturer. Considering the applicable power tolerance, the torque setting for 2, 3, 4 & 5 mode, shall be based on actual torque measured at 1st mode during test.

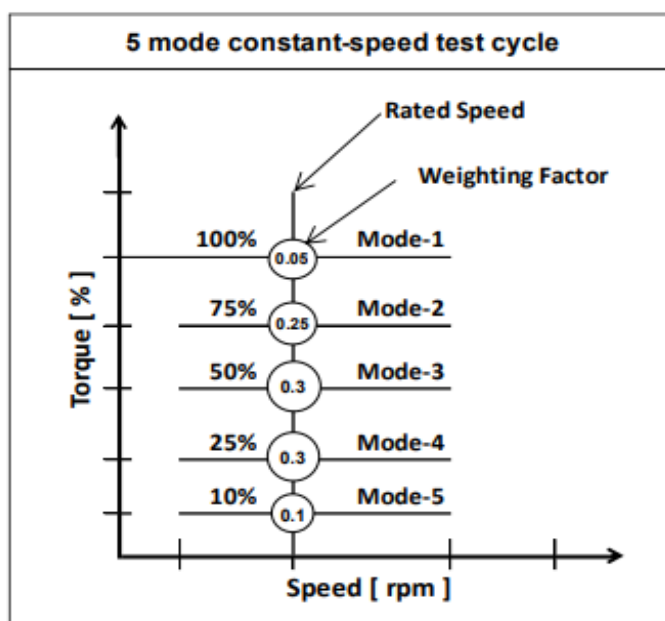


Table C —RMC-D2 test modes

RMC mode number	Time in mode (s)	Engine speed (%) a	Torque (%) b c
1a Steady State	53	100	100
1b Transition	20	100	Linear transition
2a Steady-state	101	100	10
2b Transition	20	100	Linear transition
3a Steady-state	277	100	75
3b Transition	20	100	Linear transition
4a Steady-state	339	100	25
4b Transition	20	100	Linear transition
5 Steady-state	350	100	50

a Rated speed as declared by manufacturer.

b % torque is relative to the torque corresponding to the rated power declared by the manufacturer.

c Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode.

Variable speed test Cycle:

Table D- 5-mode variable speed test modes

Test modes and weighting factors				
Mode number	Engine Speed (a)	Power % (b)	Weighting factor	Mode length (Second)
1	Declared Speed (Rated speed)	100	0.05	600
2	Declared Speed	75	0.25	600
3	Declared Speed	50	0.30	600
4	Declared Speed	25	0.30	600
5	Declared Speed	10	0.10	600

(a) Pre-verified declared rated & part load speed as per Appendix 9 of this Annexure

(b) per cent power is relative to the power corresponding to the rated gross power declared by the manufacturer. Require torque values for dyno setting for each mode to be calculated based on the declared speed values

Note:

a) The engine manufacturer shall declare rated speed, rated power, and part load speeds of the engine. The part load speeds shall be as mentioned in above table. The part load speeds shall be verified on actual working condition of Genset at manufacturer's place by Test Agency before dismantling the set and submitting the engine for emission test.

b) Refer Appendix 9 of this Annexure -Test Procedure for emission measurement from Variable Speed Diesel Engines for Power generating set Application.

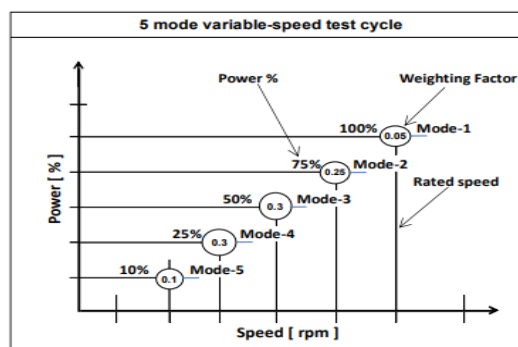


Table E — Discrete C1 test modes

Mode number	1	2	3	4	5	6	7	8
Speed a	100%				Intermediate			Idle
Torque b (%)	100	75	50	10	100	75	50	0
Weighting factor	0,15	0,15	0,15	0,1	0,1	0,1	0,1	0,15
a Refer ISO-8178 Part 4 for determination of required test speeds.								
b The % torque is relative to the maximum torque at the commanded engine speed.								

Table F —RMC-C1 test modes

RMC Mode Number	Time in mode(s)	Engine speed a c	Torque (%) b c
1a Steady-state	126	Idle	0
1b Transition	20	Linear transition	Linear transition
2a Steady-state	159	Intermediate	100
2b Transition	20	Intermediate	Linear transition
3a Steady-state	160	Intermediate	50
3b Transition	20	Intermediate	Linear transition
4a Steady-state	162	Intermediate	75
4b Transition	20	Linear transition	Linear transition
5a Steady-state	246	100%	100
5b Transition	20	100%	Linear transition
6a Steady-state	164	100%	10
6b Transition	20	100%	Linear transition
7a Steady-state	248	100%	75
7b Transition	20	100%	Linear transition
8a Steady-state	247	100%	50
8b Transition	20	Linear transition	Linear transition
9 Steady-state	128	Idle	0
a Refer ISO-8178 Part 4 for determination of required test speeds.			
b % torque is relative to the maximum torque at the commanded engine speed.			
c Advance from one mode to the next within a 20-second transition phase. During the transition phase, command a linear progression from the torque setting of the current mode to the torque setting of the next mode, and simultaneously command a similar linear progression for engine speed if there is a change in speed setting.			

In addition, the following requirements shall apply:

Summary of the requirement:

Requirement	Power Category, kW		
	$P \leq 19$	$19 < P \leq 56$	$56 < P \leq 800$
Deterioration Factors (DF)	N/A	Yes	Yes
Crankcase emission	N/A	N/A	Yes
Adjustment factor (IRAF)	N/A	Yes ^a	Yes ^a
Off cycle emission-Control area	Yes ^b	Yes ^b	Yes ^b
Ammonia emission	Yes ^c	Yes ^c	Yes ^c
NOx control measures	Yes ^{c1}	Yes ^{c1}	Yes ^{c1}
Particulate control measures	Yes ^d	Yes ^d	Yes ^d
Control conditions-Altitude, Temperature	N/A	N/A	Yes ^e
Telematics for remote monitoring	N/A	N/A	Yes ^f
^a Applicable for engine with exhaust after-treatment systems that are regenerated on an infrequent (periodic) basis ^b Applicable for electronically controlled constant speed & variable speed engines ^c Applicable for SCR engine using reagent to reduce NOx emissions ^{c1} Applicable for engines using electronic control on devices which are used to reduce NOx emission, (i.e. EGR, SCR) ^d Applicable for engine using exhaust after treatment device to reduce Particulate emissions ^e Applicable for electronically controlled engine using auxiliary emission control strategy to operate in altitude. Demonstration is only at time of type approval only once and not applicable during COP. ^f Applicable for electronically controlled constant speed & variable speed engines			

- A. **Off cycle emission** for electronically controlled constant speed Compression Ignition engines & Dual Fuelled engines of all power categories when emission of gaseous and particulate sampled within the applicable control area shall not exceed the applicable emission limit values by a factor of 2.0. (i.e., 2 times the emission limits) as set out details in System & Procedure Regulation.
- B. **Ammonia emission** over the test cycles for engines equipped with SCR shall not exceed a mean value of 25 ppm for engine power category less than or equal to 56 kW and 10 ppm for engine power category above 56 kW as set out details in System & Procedure Regulation.
- C. **Engine Durability Period and Deterioration Factor** shall be applicable to above 19 kW power category only as set out in details in System & Procedure Regulation.

Engine Durability Period

Category (Power Band)	Emission durability period (hours)
>19 ≤ 56 kW (constant speed Engines)	3000
>19 ≤ 56 kW (Variable speed Engines)	5000
> 56 kW (All engines)	8000

Note: DF determined during type approval will be carried over.

Category (Power Band)	Deterioration Factors (DF)			
	CO	HC	NOx	PM
>19 kW (Constant / Variable Speed Engine)	1.3	1.3	1.15	1.05

Assigned multiplicative deterioration factors

Note: When opted for assigned multiplicative DF, no verification is required.

- D. NOx control measures:** Engines which rely on the use of any external devices and or reagent (e.g. urea for SCR) in order to reduce emissions, shall ensure the correct operation of NOx control measures as set out in details in System & Procedure Regulation.
- E. Particulate control measures:** Engines which rely on the use any external devices and or exhaust after treatment devise to reduce Particulate Matter emissions, shall ensure the correct operation of PM control measures, as set out in System & Procedure Regulation.
- F. Infrequent Regeneration Adjustment factor (IRAF)** shall be applicable for the engine above 19 kW power category equipped with exhaust after-treatment systems that are regenerated on an infrequent (periodic) basis as set out details in System & Procedure Regulation.
- G. Gross Power & Speed tolerance:** The gross declared power of the engine shall be measured on the test bench at rated speed of engine. The measured power and speed may differ from the power and speed declared by manufactured as specified below.

Case	Gross Power Tolerance		Speed Tolerance	
	Constant speed	Variable speed	Constant speed	Variable speed
Type Approval	± 5% at rated for single cylinder engines ± 4% at rated for others engine		± 1% at rated	± 1% at rated & all part load points
CoP	± 6% at rated for single cylinder engines ± 5% at rated for others engine			

- H. Crankcase ventilation requirement** shall be applicable to above 56 kW power category engines as set out details in System & Procedure Regulation.
- I. Control Conditions-Altitude, Temperature:** Electronically controlled engine using auxiliary emission control strategy shall demonstrate the compliance requirement over control conditions at type approval as set out details in System & Procedure Regulation. This clause is applicable to for power band above 56 kW electronically controlled engine using auxiliary emission control strategy to operate in altitude.
- J. Additional requirement for dual fuelled engine** shall be applicable as set out details in System & Procedure Regulation.
- K. Additional requirement for variable speed engine** shall be applicable as set out details in System & Procedure Regulation. (demonstration/ determination/ verification of declared speed values for emission test cycle)

A2. FOR POSITIVE IGNITION ENGINES

The emissions of the carbon monoxide, the emissions of non-methane hydrocarbons / reactive hydrocarbon / Non-Methane Organic gas, and the emissions of the oxides of nitrogen during emission certification and conformity of production emission test/s conducted in accord with system & procedure regulation considering applicable deterioration factor, adjustment factor, shall not exceed the amount shown in Table below:

Emission limits for Genset engines up to 800 kW Powered by PI engines

Power Category, kW	Ignition type	NOx	HC	NOx +HC	CO
		g/kWh			
$P \leq 8$	PI	-	-	7.5	3.5
$8 < P \leq 19$	PI	-	-	4.7	3.5
$19 < P \leq 56$	PI	-	-	4.7	3.5
$56 < P \leq 560$	PI	0.40	0.19	-	3.5
$560 < P \leq 800$	PI	0.67	0.19	-	3.5

Notes:

- a) The above limits are applicable for constant speed
- b) Every manufacturer, importer or assembler (hereafter referred as manufacturer) of the engine for genset application manufactured or imported into India shall obtain Type Approval and comply with Conformity of Production (COP) requirements of their product(s) for emission limits which shall be valid for next COP year.
- c) The above-mentioned limit shall be applicable to Type approval and Conformity of Production (COP) carried out by authorized test agencies.
- d) The term 'COP year' means the period from 1st July of a calendar year to 30th June of the following year
- e) HC* - NMHC shall be considered for natural gas or RHC in case of LPG or NMoG in case of alcohol-based fuels

Note: NMHC = THC – CH₄ for natural gas operation or NMHC = 0.3 X THC

RHC = 0.5 X THC for LPG operation

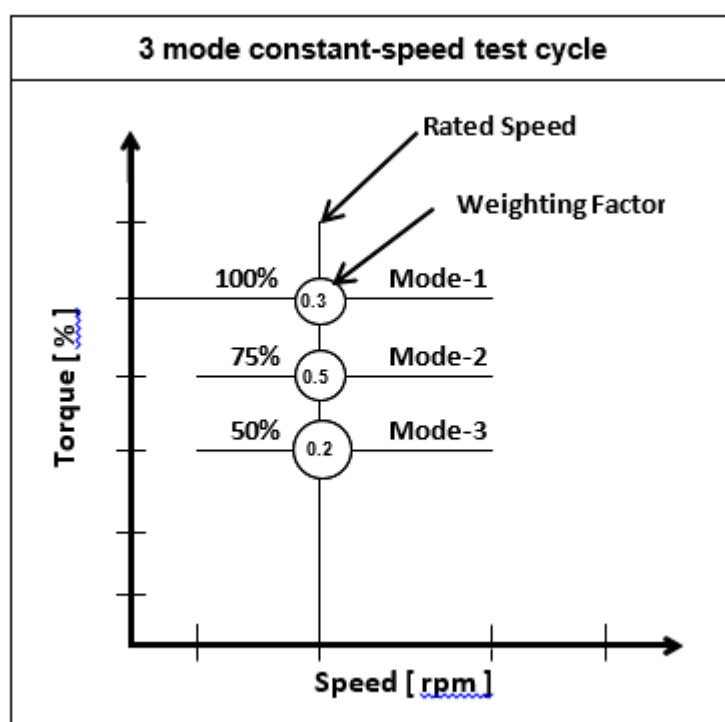
Speed operation	Emission Test Cycle
Constand speed engine	D1 3-mode Steady-state discrete mode test cycle specified in ISO-8178-Part 4

Test Cycle



Table B- Discrete D1 test modes

Test modes and weighting factors			
Mode (cycle D1) number	1	2	3
Speed (a)	100%		
Torque (b) (%)	100	75	50
Weighting factor	0.3	0.5	0.2
Mode length (Second)	600	600	600
(a) Rated speeds as declared by manufactured			
(b) per cent torque is relative to the torque corresponding to the rated gross power declared by the manufacturer. Considering the applicable power tolerance, the torque setting for 2 & 3 mode, shall be based on actual torque measured at 1 st mode during test.			



In addition, the following requirements shall apply:

Requirement	Power Category		
	$P \leq 19$	$19 < P \leq 56$	$56 < P \leq 800$
Deterioration Factors (DF)	N/A	Yes	Yes
Crankcase emission	N/A	N/A	Yes
Ammonia emission	Yes ^a	Yes ^a	Yes ^a
Control conditions-Altitude, Temperature	N/A	N/A	Yes ^b
Telematics	N/A	N/A	Yes ^c
NCD- Oxygen Sensor and Catalytic Monitoring	Yes ^d	Yes ^d	Yes ^d
^a Applicable SCR engine using reagent to reduce NOx emissions ^b Applicable for electronically controlled engine using auxiliary emission control strategy to operate in altitude. Demonstration is only at time of type approval only once and not applicable during COP. ^c Applicable for electronically controlled constant speed engines ^d NCD- Oxygen Sensor and Catalyst Monitoring needs to be demonstrated at the time of Type Approval			

a) Ammonia emission over the test cycles for engines equipped with SCR shall not exceed a mean value of 25 ppm for engine power category less than or equal to 56 kW and 10 ppm for engine power category above 56 kW as set out details in System & Procedure Regulation

b) Engine Durability Period and Deterioration Factor shall be applicable to above 19 kW power category only as set out details in System & Procedure Regulation.

Engine Durability Period

Category (Power Band)	Emission durability period (hours)
>19 ≤ 56 kW (constant speed Engines)	3000
> 56 kW (All engines)	8000

Note: DF determined during type approval will be carried over.

Category (Power Band)	Deterioration Factors (DF)		
	CO	HC	NOx
>19 kW (Constant Speed Engine)	1.3	1.3	1.15

Assigned multiplicative deterioration factors

Note: When opted for assigned multiplicative DF, no verification is required.

c) Gross Power & Speed tolerance: The gross declared power of the engine shall be measured on the test bench at rated speed of engine. The measured power and speed may differ from the power and speed declared by manufacturer as specified below.

Case	Gross Power Tolerance	Speed Tolerance
	Constant speed	Constant speed
Type Approval	$\pm 5\%$ at rated for single cylinder engines $\pm 4\%$ at rated for others engine	$\pm 1\%$ at rated
CoP	$\pm 6\%$ at rated for single cylinder engines $\pm 5\%$ at rated for others engine	

e) **Crankcase ventilation** requirement shall be applicable to above 56 kW power category engines as set out details in System & Procedure Regulation.

f) **Control Conditions-Altitude**, Temperature: Electronically controlled engine using auxiliary emission control strategy shall demonstrate the compliance requirement over control conditions at type approval as set out details in System & Procedure. This clause is applicable to for power band above 56 kW electronically controlled engine using auxiliary emission control strategy to operate in altitude.

g) **NO_x control measures**: Engines which rely on the use of any external devices (3-Way catalyst, EGR) and or reagent (e.g. urea for SCR) in order to reduce emissions, shall ensure the correct operation of NO_x control measures as set out in details in System & Procedure Regulation.

h) **Safety code of practices** for alternate fuels shall be as defined in System and Procedure Regulation.

A3. FOR PORTABLE GENERATOR SET

The emissions of the carbon monoxide, the emissions of hydrocarbons and the emissions of the oxides of nitrogen obtained during emission certification and conformity of production emission test/s conducted in accord with in Annexure 4 of this regulation shall not exceed the amount shown in Table below:

Emission limits for Portable Genset engines

Class	Engine displacement (cc)	CO (g/kWh)	NOx +THC NOx + NMHC NOx + RHC (g/kWh)	Test Cycle
1	Up to 99 cc	250	10	D1-3-mode test cycle as specified in ISO 8178 Part 4
2	> 99 and up to 225 cc	250	8	
3	> 225 cc	250	6	

Notes:

- 1) The test shall be done on resistive load bank.
- 2) The testing shall be done as per test procedures mentioned in System & Procedure Regulation.
- 3) Test method shall be as specified in ISO 8178: Part 1 & 4, Reciprocating internal combustion engines — Exhaust emission measurement; Steady-state and transient test cycles for different engine applications. The measurement mode shall be D1-3 mode cycle specified under ISO 8178: Part 4 (Weighting Factor of 0.3 for 100 percent load, 0.5 for 75 percent load and 0.2 for 50 percent load). Detail procedure is laid down in System & Procedure Regulation.
- 4) Every manufacturer, importer or assembler (hereafter referred as manufacturer) of the genset manufactured or imported into India shall obtain Type Approval and comply with Conformity of Production (COP) requirements of their product(s) for emission limits which shall be valid for next COP year.
- 5) The above-mentioned limit shall be applicable to Type approval and Conformity of Production (COP) carried out by authorized test agencies. The term 'COP year' means the period from 1st July of a preceding calendar year to 30th June of the following year
- 6) Specific provisions on total hydrocarbon (HC) limits for fully and partially gaseous-fuelled engines (This shall apply to dual fuel engines)
- 7) NOx + NMHC shall be measured in case of NG genset. NMHC shall be equal to $0.3 \times \text{Total Hydrocarbon (THC)}$ in case of NG. Alternatively, NMHC can be measured by subtracting

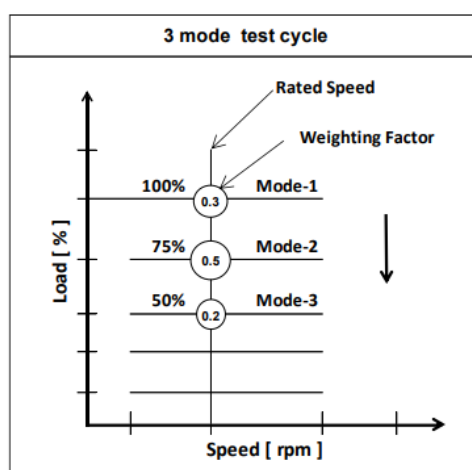
CH4 emission from THC. NOx + RHC shall be measured in case of LPG genset and RHC is equal to 0.5×THC in case of LPG

8) Testing shall be on complete genset which includes silencer, air filter, alternator, canopy etc. the prototype shall be acceptable.

Emission test cycle using resistive load bank:

Emissions from the portable gensets powered by SI engine (up to 800 cc displacement) shall be tested using Resistive Load Bank as per following 3-mode test cycle. (Reference ISO 8178-Part-4)

Mode No.	Load current	Frequency	Weighting Factor
1	Maximum output declared by the manufacturer of the genset (tolerance $\pm 5\%$ for TA and $\pm 6\%$ for COP)	50 +1Hz	0.3
2	75% of Mode 1	50 +1Hz	0.5
3	50% of Mode 1	50 +1Hz	0.2



Engine power at crankshaft: The power Pcorr of the 1st mode and speed/frequency may differ from the power and speed/frequency declared by manufacturer as specified below.

#	Gross Power Tolerance	Speed/Frequency Tolerance
Type Approval	$\pm 5\%$ at rated	$\pm 2\%$ at rated & all part load points
COP	$\pm 6\%$ at rated	

(Reference: "System and Procedure for compliance to revised emission standards (dated 03.11.2022) for power generating set engines (up-to gross mechanical power 800 KWs)" published by CPCB, dated 28/03/2023) and GSR 804(E) Dated 03-11-2022

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