

Emission Regulations

FGW Generators has become aware over the last number of years that there seems to be confusion over worldwide emissions legislation for internal combustion engines installed in non-road mobile machinery (NRMM). In the hope of providing some clarity, we have created a short document on the legislation as we understand it from our research.

European emission standards for engines used in NRMM have been structured in progressively more stringent tiers known as Stage I to V standards. Stage I to IV regulations for diesel engines were specified by Directive 97/68/EC in 1997 and five amending Directives adopted from 2002 to 2012. Stage V was published in 2016 under Regulation 2016/1628 and specifies emission requirements for all categories of compression ignition (diesel) and positive ignition mobile nonroad engines. Stage V now replaces all previous stages from Directive 97/68/EC and its amendments.

It is therefore not possible to buy new engines officially certified to a European Stage for Stage IIIA and below anymore, as the legislation is no longer in place and the time bounds set for certifying and selling engines has passed. Now all you can purchase is an engine that meets the previous set levels for legislation which is now superseded.

Please see some relevant emission regulation below. Tabulated are the levels that you must not exceed to meet the regulation along with worst case last engine placement date on the market.

	NOx (g/kWh)	HC (g/kWh)	NOx + HC (g/kWh)	PM (g/kWh)	CO (g/kWh)	Power	Region	Last Engine Certification Date	Last Engine/Machine Market Placement Date
Stage II	6.0	1.0	-	0.2	3.5	≤ 560 kW	Europe Non Road	31/12/10	31/12/12
Stage IIIA	-	-	4.0	0.2	3.5	≤ 560 kW	Europe Mobile	31/12/18	31/12/20
Stage V	0.4	-	-	0.02	-	≤ 560 Kw and above	Europe Mobile	Existing legislation	Existing legislation

You will see from the above that the Stage II and IIIA market placement dates have passed. There will therefore be no third-party certification to verify these stages.

An important point to note is that the Stage V emission legislation is based on fuel being used with a Sulphur content of 10 to 20 parts per million (PPM). The diesel widely used in South Africa is 50 PPM, which would cause a material difference in the emissions from any generating sets that had emission compliant engines.

Authorities in the EU, USA, and Japan have been under pressure from engine and equipment manufacturers to standardize worldwide emission regulations to streamline engine development and emission type approval/certification for different markets. The Stage I/II limits were in part synchronized with US regulations. Stage III/IV requirements were synchronized to a large degree with the US Tier 3/4 standards. However, at Stage V the synchronization has been largely lost—the European Stage V Particulate Number limits require diesel particulate filters (DPF) on all affected engines, while the US Tier 4 standards can be met without filters. Therefore, the EU regulation is more stringent than the US.

Another commonly used Emission Standard is the German TA Luft standard. This has another set of emission rules, which are present below:

Liquid Fuel	Power (MW _{th})	CO ^b (g/Nm ³)	NO _x ^b (g/Nm ³)	HCHO (mg/Nm ³)	TD (mg/Nm ³)
Diesel, light fuel oil, ethanol, methanol, etc	<3	0.3	1	60	20/80 ^a
	≥3	0.3	0.5	60	20/80 ^a

- a) Higher value applies to engines used for emergency operation only or peak shaving operation for less than 300 hours a year.
- b) Limits do not apply to emergency engines or engines used for peak shaving for less than 300 hours a year.

TECHNICAL INFO

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FGW Generators

UK Parent Company A.J. Power Ltd

Errors and omissions are excepted. We have done our best to summarise the legislation in an accurate manner, but it does not replace the official legislative text of:

- Stage II - [Directive 97/68/EC](#)
- Stage IIIA - [Directive 97/68/EC](#) (as amended)
- Stage V - [Directive 2016/1628](#) (which amends and repeals Directive 97/68/EC and is the current EU emission legislation)
- TA Luft - [TA Luft 2002](#) (German version only binding version)



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