
LNG vs
DIESEL
EURO6
ALL THE ADVANTAGES OF METHANE
AND LIQUID BIOMETHANE
1 FIRST ITALIAN
COMPANY TO USE
LIQUID METHANE
POWERED VEHICLES
LCE
INTERNATIONAL NATURAL TRANSPORT

REDUCED EMISSIONS FOR SUSTAINABLE TRANSPORT.

In virtue of its ultra-low carbon chemical structure (CH4), methane is a fuel which **releases less pollutants during combustion compared to diesel**.
In this graph, values refer to the reduction of emissions for each specific pollutant in a methane engine compared to limits set by the Euro 6 standard for diesel engines. The use of biomethane will enable a drastic reduction of CO2 only, following natural compensation during production.

UP TO
15% LESS CO_2
-2.905.534* Kg
AND -95% WITH BIOMETHANE
... AMOUNTING TO APPROXIMATELY 6,000,000 FOOTBALLS!

UP TO
70% LESS NO_x
-3.223.328* g
... AMOUNTING TO APPROXIMATELY 50,000 TENNIS BALLS!

UP TO
-95% LESS PM
-1.658.856.095* mg
... AMOUNTING TO APPROXIMATELY 580,000 TABLE TENNIS BALLS!

* COMPARED TO EURO6 DIESEL
DATA FOR THREE YEAR PERIOD 2016/2018 LC3

NOISE REDUCTION

In otto cycle engines, combustion stroke occurs by means of controlled auto ignition, unlike in diesel engines, where it occurs by means of compression: **this results in a significant noise reduction.**

REDUCTION OF NOISE POLLUTION -5DB (A)

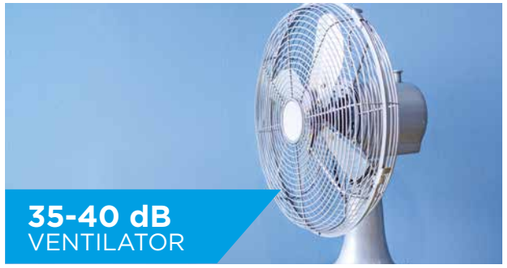
Perspectives: reduction of noise pollution by 5dB(A), amounting to a reduction of perceived noise 4 times greater compared to a Euro6 Diesel.

REDUCTION OF PERCEIVED NOISE -75%

* COMPARED TO EURO6 DIESEL – 2016 DATA LC3

DECIBEL COMPARED

TO ARPA (Regional Agency for the Protection of the Environment) 2015 DATA



COMPARISON OF TECHNICAL CHARACTERISTICS

LNG	VS	DIESEL
AUTOIGNITION TEMPERATURE		
537°C		210°C
IN CASE OF FIRE		
Under the action of fire, the tank can dissipate gas without exceeding maximum design pressures.		The liquid starts to boil, the pressure rises and in the worst case scenario, the tank may explode.
IN CASE OF LEAKAGE		
Small leaks evaporate rapidly into the atmosphere, whereas bigger leaks remain on the ground and vaporize.		The fuel forms a puddle on the ground which does not evaporateimmediately.
FLASH POINT		
5-15%		0,6-6,5%

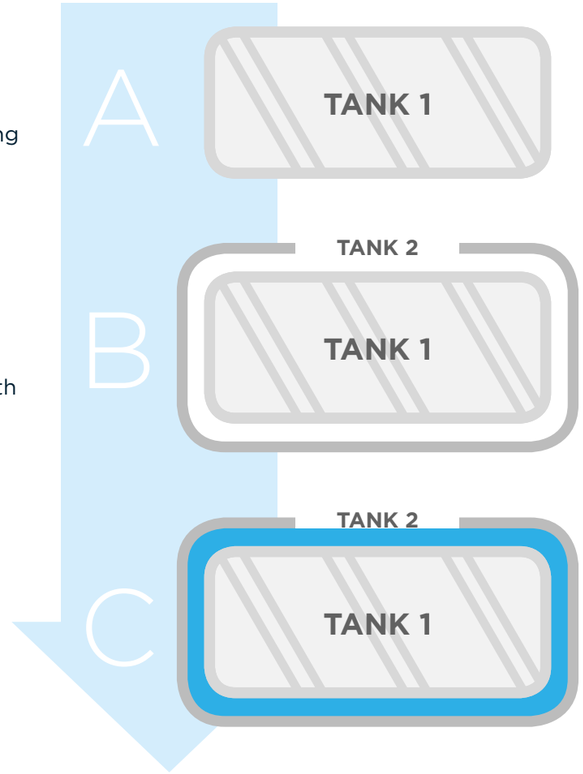
HOW IT WORKS

Try to think of the cryogenic tank in vehicles which run on liquid methane as an astronaut's suit. The outer layer (visible) **protects from shocks and reflections** of sun rays. The inner layer, thanks to its insulating material cover and total absence of air between both layers, **maintains liquid** methane **at input temperature** and at a pressure of no more than 8 atmospheres.

PHASE A
The tank is wrapped in several layers of insulating material.

PHASE B
the tank is placed inside another tank

PHASE C
a vacuum is created between the walls of both tanks, resulting in ***super cryogenic insulation.***



TEST PROOF SAFETY

Are liquid methane tanks sensitive to collisions?

NO! As proven by the **DROP TEST**: a full LNG tank is dropped from a height of 9 metres onto its most critical part and from 3 metres on the part with tubes and valves. No liquid must leak within an hour from impact.

Does liquid methane explode easily?

NO! As proven by the **BONFIRE TEST**: a full LNG tank connected to all devices is subjected to fire (590°C) and must withstand this condition for longer than 5 minutes, without exploding and without the opening of any safe valves.

Pressure can easily compromise an LNG tank?

NO! Safety is determined by the **PRESSURE TEST**: every single tank is subjected to 1.3 times the maximum design pressure and must not show any leaks, damage or defects.

RAPID AND SAFE REFUELLING

LNG refuelling is safer because the nozzle and tank are hermetically connected.
In contrast, during DIESEL refuelling, the tank is open and toxic vapour may be released.

SAFETY
IN USE

RAPID REFUELLING
TIMES

TANK

NOZZLE

HOSE

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