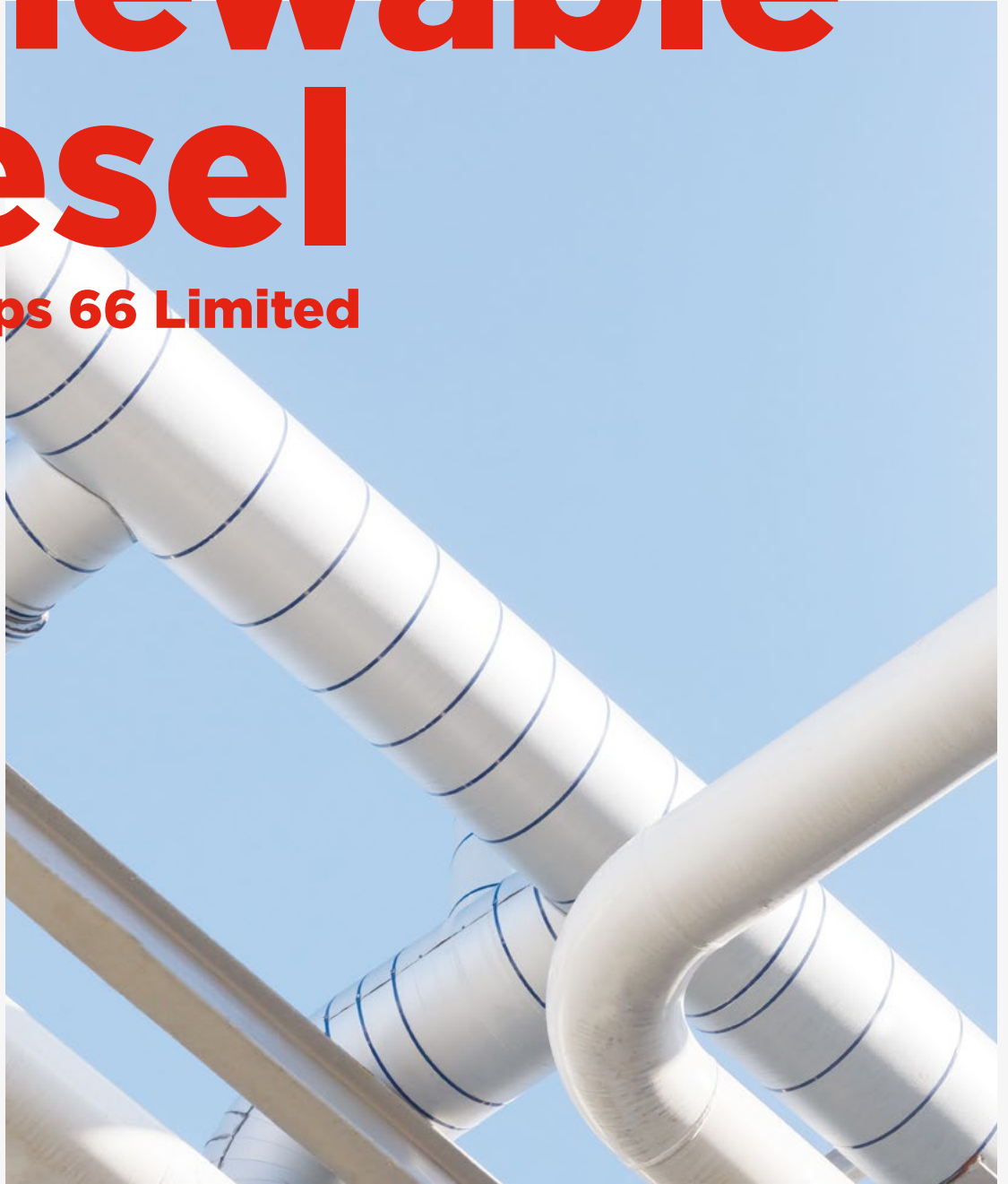


Introducing renewable diesel

from Phillips 66 Limited



**PROVIDING ENERGY.
IMPROVING LIVES.**

WHAT IS RENEWABLE DIESEL SOLD BY PHILLIPS 66 LIMITED?

Renewable diesel sold by Phillips 66 Limited is a paraffinic fuel that is chemically very similar to conventional fossil fuel based diesel but derived from biomass sources such as used cooking oil, fats, greases and vegetable oils, resulting in a fuel of significantly lower carbon intensity than fossil fuel. It is a high-quality alternative to conventional fossil diesel, meets the BS EN 15940 specification and as a 100% hydrocarbon fuel, renewable diesel sold by Phillips 66 Limited is chemically very similar to fossil based BS EN 590 Diesel which means that it can be used without modification to the engine or its fuel system in most cases, either on its own or when mixed with BS EN 590 diesel.¹

Renewable diesel sold by Phillips 66 Limited meets specific sustainability and supply chain criteria that qualify it as a renewable transport fuel under UK law² and its compliance with such criteria is independently verified.³ Phillips 66 Limited maintains regularly audited records and supporting documentation on the sustainability characteristics and traceability of each batch of renewable diesel sold by Phillips 66 Limited and is certified⁴ to declare those characteristics and the fuel lifecycle GHG emissions savings for each delivery it makes.

WHAT ARE THE FUEL LIFECYCLE GREENHOUSE GAS (GHG) EMISSIONS SAVINGS OF RENEWABLE DIESEL SOLD BY PHILLIPS 66 LIMITED COMPARED TO CONVENTIONAL FOSSIL DIESEL?

The fuel lifecycle GHG emissions savings of renewable diesel sold by Phillips 66 Limited compared to conventional fossil diesel will depend on the type of non-fossil feedstock used to produce it. A minimum of 65% fuel life cycle GHG emissions savings compared to conventional fossil fuels are required and assured under the Renewable Fuel Assurance Scheme (RFAS)⁵ performance standard. Although fuel lifecycle GHG emissions savings of up to 90% are possible, savings are typically less than this, but never less than the required 65% minimum.

The fuel lifecycle GHG emissions savings are calculated using methodologies independently assured under the RFAS, using a fossil fuel comparator carbon intensity of 94 gCO₂e/MJ. Carbon intensity (CI) is the CO₂ emission rate, measured by grams of carbon dioxide emitted per megajoule of energy produced (gCO₂e/MJ). By way of example, using the comparator of 94 gCO₂e/MJ, a CI of 16 attributable to a batch of renewable diesel sold by Phillips 66 Limited provides fuel lifecycle GHG emissions savings of 82.98% compared to the lifecycle emissions of a fossil fuel.

¹ Whilst renewable diesel sold by Phillips 66 Limited has been approved for use by multiple vehicle manufacturers, BS EN 15940 requires us to note that paraffinic diesel fuel is not suitable for all vehicles and users should consult their vehicle manufacturer before use.

² "renewable transport fuel" as defined under [Energy Act 2004 c. 20](#), s. 132 Interpretation of Chapter 5 of Part 2 and applied under the Renewable Transport Fuel Obligation Order 2007/3072 (as amended.) The Renewable Transport Fuel Obligation Order (RTFO) regulates renewable fuels used for transport in the UK. For further information see our website: [Phillips 66 | Renewable Diesel](#).

³ By: the Zemo Partnership Renewable Fuels Assurance Scheme (RFAS). Phillips 66 Limited is an approved Renewable Fuel Supplier under the RFAS, our reference number is PH/P13/2.2.

⁴ see footnote 3

⁵ The Zemo Partnership Renewable Fuels Assurance Scheme (RFAS) has been developed to give independent assurance of the greenhouse gas emissions and feedstock sustainability performance of high blend renewable fuels sold in the UK. Phillips 66 Limited is an approved Renewable Fuel Supplier under the RFAS and our reference number is PH/P13/22. For further information on the RFAS standards and the criteria that Phillips 66 Limited must demonstrate compliance with, see: [Renewable Fuels Assurance Scheme](#)

PRODUCT SPECIFICATIONS

The following table identifies some key technical differences in properties between typical BS EN 590 Diesel and renewable diesel sold by Phillips 66 Limited (meeting BS EN 15940).

PROPERTIES	UNITS	BS EN 590 DIESEL	RENEWABLE DIESEL SOLD BY PHILLIPS 66 LIMITED (MEETING BS EN 15940)
APPEARANCE		Water like to Amber	Water like to Amber
CETANE NUMBER		≥ 51.0	≥ 70.0
COLD PERFORMANCE			
CLOUD	°C Max	-5 (Winter)	Typically -10 (Winter)
CFPP	°C Max	-5 (Summer) -15 (Winter)	Typically -10 (Summer) Typically -20 (Winter)
FAME CONTENT	% (v/v)	< 7.0	< 0.2*
SULPHUR	ppm	< 10	< 5
AROMATIC CONTENT**	% m/m	< 8	< 1
CARBON RESIDUE	% m/m	<0.35	<0.10
DENSITY ***	Kg/m ³	820-845	765-800

* No FAME is intentionally added

** Aromatics, including polycyclic aromatic hydrocarbons (PAHs), are environmental pollutants that are formed in the combustion process of carbonaceous materials at high temperature.

*** renewable diesel sold by Phillips 66 Limited is lighter than typical BS EN 590 but does not affect the operability of diesel engines

HIGHER CETANE

As set out in the Product Specifications above, renewable diesel sold by Phillips 66 Limited has a minimum cetane number of 70 which is higher than the minimum cetane number of 51 of BS EN 590 Diesel. Higher cetane allows for easier starting, more complete combustion of the fuel, and a smoother running engine while reducing the emissions of smog-forming hydrocarbons, carbon monoxide, and soot.



RENEWABLE DIESEL SOLD BY PHILLIPS 66 LIMITED FAQs

1. Do I need to modify my engine or storage infrastructure of renewable diesel sold by Phillips 66 Limited, and can I blend/mix it with BS EN 590 Diesel?

As a 100% hydrocarbon fuel, renewable diesel sold by Phillips 66 Limited is chemically similar to fossil-based BS EN 590 Diesel which means that it can be used without modification to the engine or its fuel system in most cases, either on its own or when mixed with BS EN 590 diesel.⁶

2. Is renewable diesel sold by Phillips 66 Limited the same as HVO?

HVO (Hydrotreated Vegetable Oil) is a term often used to describe a type of renewable diesel produced through hydrotreatment. HVO emerged when only vegetable oils (e.g. rapeseed, soybean and corn oil) were used as feedstocks. However, with the advancement in production methods allowing the use of waste fats, oils and residues, feedstocks are now not limited to vegetable oils. This is also the case for renewable diesel sold by Phillips 66 Limited which is derived from biomass sources such as used cooking oil, fats, greases and vegetable oils.

3. Is renewable diesel sold by Phillips 66 Limited the same as Diesel meeting BS EN 590?

Renewable diesel sold by Phillips 66 Limited will always meet the BS EN 15940 specification requirement. However, as it includes a lubricity additive (also found today in BS EN 590 Diesel), it exceeds BS EN 590 Diesel specification requirements in all but its density. Renewable diesel sold by Phillips 66 Limited has better cetane, better cold flow properties, less harmful PAH (Poly Aromatic Hydrocarbons) and has no FAME blended into it compared to BS EN 590. It has a typical density of 765-800 kg/m³ @ 15C compared with 820-845 kg/m³ @ 15C for BS EN 590 Diesel.

4. Does renewable diesel sold by Phillips 66 Limited have a longer shelf life than BS EN 590 Diesel?

The shelf life of any fuel is highly dependent on the condition of the storage tank and undertaking good housekeeping practices. Provided these conditions are in line with good practice, renewable diesel sold by Phillips 66 Limited will outperform BS EN 590 Diesel for shelf life as it does not have FAME added and has improved cold flow properties.

5. What is lubricity additive and why is it required in renewable diesel sold by Phillips 66 Limited?

The lubricity additive in renewable diesel sold by Phillips 66 Limited helps to lubricate the engine. Historically, it was the sulphur in fuel that did this, but with the reduction of sulphur there is now a need for lubricity additive, which is commonly found in BS EN 590 Diesel today. As renewable diesel sold by Phillips 66 Limited contains even less sulphur, a lubricity additive is blended with the fuel to make it more suitable for use within an engine that would normally use BS EN 590 Diesel.

6. What is the Renewable Transport Fuel Obligation Order (RTFO) and where can I find out further information?

The Renewable Transport Fuel Obligation Order (RTFO) regulates renewable fuels used for transport in the UK. For more information see our website: [Phillips 66 | Renewable Diesel](#).

⁶ see footnote 1