

A close-up photograph of a diesel engine, illuminated with a strong blue light. The image shows various mechanical components like pistons, valves, and a large circular cover on the right side. The lighting creates deep shadows and bright highlights, emphasizing the metallic textures and complex geometry of the engine parts.

**Renewable  
and low carbon  
intensity fuels**  
for use in  
diesel engines

 **Perkins®**

THE HEART OF EVERY GREAT MACHINE



# Introduction

Renewable fuels are derived from renewable resources such as planted crops (soy, palm, rapeseed, etc.), used cooking oil, animal fat, biomass, algae, and others. Renewable fuels reduce the carbon footprint of diesel engines on a Life Cycle Analysis basis.

Renewable fuels that are derived from fats and oils may be processed through hydrotreating. The result is a high paraffinic renewable diesel (RD), also called hydrotreated vegetable oil (HVO), that can be used in diesel engines.

Biomass and syn gas can be converted into liquid fuels through various processes and their products are typically known as biomass-to-liquid (BTL) or gas-to-liquid (GTL). Depending on the original feedstock these products may be renewable. BTL, GTL and HVO have similar chemistries and performance specifications, and all can be used in diesel engines.



# Guidelines

Note that low carbon intensity and renewable fuels covered in this paper are different than biodiesel fuel.

Low carbon intensity fuels are typically paraffinic hydrocarbons, hence these fuels, whether at 100% or blended, can be used as drop-in replacements for diesel fuel. These fuels have many benefits:

- They can be renewable, which can significantly reduce the carbon footprint or Greenhouse Gas (GHG) impact of the engine up to 90%.
- They have a high cetane number.
- They can be formulated to provide low temperature capability. Consult with your supplier to ensure the fuel meets the ambient temperature requirements of the application.
- They can reduce the emissions of certain products of incomplete combustion, such as unburned hydrocarbons (UHC), soot, and carbon monoxide (CO). They may also reduce NOx emissions under certain engine loads and cycles.

In order to be applicable for Perkins diesel engines, Perkins recommends that renewable and low carbon intensity fuels meet the latest version of any of the following specifications:

- EN15940, which defines quality requirements for BTL, GTL and HVO. This is the preferred specification for renewable and low carbon intensity fuels covered in this paper.
- ASTM D975, which is the specification for diesel fuel in the United States.
- EN 590, except for its density provisions. This is the specification for diesel fuel in Europe.
- The Perkins Diesel Fuel Specification, except for its density provisions.

Renewable and low carbon intensity fuels that meet the requirements listed above can be used at:

- 100 percent (may be called RD100, HVO100, or GTL 100);
- Any blend level with diesel fuel;
- Any blend level with a maximum of 20% biodiesel\*
- Any blend level with a combination of diesel fuels and a maximum 20% biodiesel\*

\*see your engine's Operation Maintenance Manual for specific biodiesel limits on your engine



Here is Perkins' guidance and potential impacts for the use of renewable and low carbon fuels according to the specifications detailed above:

- No specific engine conversion process is needed when these fuels are used for the first time or thereafter.
- These fuels may reduce the power output of engines due to their low density. Up to a 5% reduction may be noted at full load.
- They are compatible with aftertreatment technologies such as diesel particulate filter (DPF), diesel oxidation catalyst (DOC) and SCR (selective catalytic reduction), and they can be used on engines that meet U.S. EPA Tier 4, EU Stage V, and similar advanced emission standards.
- They are compatible with filters and engine oils used with typical diesel fuels. No impact on maintenance intervals is expected. In general, it is recommended that oil drain intervals are based on oil analysis.
- They are compatible with elastomeric materials and hoses used on most modern engines. Certain elastomers used in older engines, such as those manufactured prior to the early 1990s, may not be compatible with the new alternative fuels. Refer to your Perkins distributor for guidance.
- They can be stored in the same tanks used for diesel fuel, and they have a similar aging life as diesel fuel.
- As with all fuels, renewable and low carbon intensity fuels have to be managed to reduce contamination and water ingress.







The use of fuels with low carbon footprints supports Perkins' sustainability initiatives. Perkins is continuously following the development of renewable and low carbon intensity fuels, and is involved in the development of appropriate specifications to ensure the successful application of these fuels in Perkins engines.

# Perkins Sales

## Americas

### North America

1600 W Kingsbury St  
Seguin  
Texas 78155  
United States  
Toll free number: 1-888-PERK-ENG

### South America

Rua Dr. Chucuri Zaidan, 1240  
Golden Tower – 17th Floor  
São Paulo – SP CEP 04711-130  
Brazil  
Tel: +55 11 2109 2038

## Asia

### China

20/F Lei Shing International Plaza  
1319 West Yan'an Road  
Shanghai 200050  
China  
Tel: +86 21 22160774  
Fax: +86 21 52136624

### India

Floor 6, Tower 'B' Prestige Shantiniketan  
The Business Precinct, Whitefield Main Road  
Bangalore 560048  
India  
Email: [IPSD\\_India@perkins.com](mailto:IPSD_India@perkins.com)

### Japan

Ocean Gate Minato Mirai 12F  
3-7-1 Minatomirai, Nishi-ku, Yokohama city  
Kanagawa, 220-0012  
Japan  
Tel: +81 45 682 3579  
Fax: +81 45 682 3690

Asahi Seimei Matsumoto Fukushima building 3F  
1-1-15 Fukashi, Matsumoto city  
Nagano, 390-0815  
Japan  
Tel: +81 263 87 2003  
Fax: +81 263 39 1682

### Korea

11F, Songchon Building, 503  
Nonhyeon-ro, Gangnam-gu  
Seoul 06132  
Korea  
Tel: +82 10 8669 8358

### Singapore

14 Tractor Road  
Singapore 627973  
Tel: +65 6828 7469  
Fax: +65 6828 7414

## Europe, Middle East and Africa

Peterborough, PE1 5FQ  
United Kingdom  
Tel: +44 1733 583000

[www.perkins.com](http://www.perkins.com)

Copyright © 2022 Perkins Engines Company Limited, all rights reserved. No part of this document may be reproduced in any forms or by any means, without prior written permission of Perkins Engines Company Limited. The information in this document is substantially correct at the time of printing and may be altered subsequently.  
Publication No. MM00117EN-01 (06-22)



THE HEART OF EVERY GREAT MACHINE

