Helping to improve local air quality

Measurements on engine test beds using standard test cycles have shown that 100% Shell GTL Fuel can give local emissions benefits in both heavy-duty and light-duty diesel engines as compared to conventional diesel. These measurements have been supplemented by testing vehicles on chassis dynamometers, using application-based cycles. These tests, often associated with customer field trials, have mirrored the local emissions reductions seen in laboratory-based testing.

Availability of Shell GTL Fuel

Shell is currently marketing 100% Shell GTL Fuel to home-based commercial vehicle fleets in Germany and The Netherlands. It can be implemented as a drop-in replacement for conventional diesel, helping to reduce local emissions immediately, without the need for investment in new vehicles or refuelling infrastructure.

Want to know more?
Contact your Commercial Fuels representative for further details and a copy of Shell’s comprehensive Shell GTL Fuel Knowledge Guide.

A number of emissions tests have been performed by Shell and collaborative partners, which confirm the benefits of using 100% Shell GTL Fuel in real engines and vehicles under controlled conditions.

*Shell GTL Fuel burns more cleanly and so produces lower local emissions compared to conventional crude oil-derived diesel.
Shell GTL Fuel is an innovative synthetic fuel produced from natural gas that can help reduce local emissions in conventional diesel vehicles.

Shell GTL Fuel contains lower levels of aromatics, poly-aromatics, olefins, sulphur and nitrogen than conventional diesel. This very high purity means that it is colourless and almost odourless. It contains only molecules found in conventional diesel, and consists almost exclusively of straight chain normal-paraffins and branched iso-paraffins. Due to this unique composition, Shell GTL Fuel has a very high cetane number and burns more cleanly, and can produce lower local vehicle emissions compared to conventional crude oil-derived diesel. In addition, because GTL products are derived from natural gas, rather than crude oil, they can help diversify supplies to the liquid fuel market.

Production process
Shell GTL Fuel is produced by a Gas to Liquids (GTL) process, which uses natural gas as a feedstock. The core chemistry of the GTL process was developed in the 1920s, and is known as the Fischer-Tropsch process after its inventors. In essence, it synthesises higher hydrocarbons from a carbon source, via synthesis gas (CO and H2), using catalysed reactions. The Shell GTL Fuel production process, known as the Shell Middle Distillate Synthesis (SMDS), contains three key steps:

1. Gasification
   - Synthesis gas (CO and H2) is manufactured from natural gas by partial oxidation

2. Synthesis
   - The synthesis gas is converted into liquid hydrocarbons using a low temperature Fischer-Tropsch process, yielding a “synthetic crude”

3. Hydrocracking/Conversion to products
   - The synthetic crude is further processed and fractionated into high quality paraffinic products, such as transportation fuels, aviation fuels and feedsstocks.

Production plants
Shell implemented the SMDS process in the world’s first commercial scale GTL plant, which opened in 1993 in Bintulu, Malaysia. Bintulu now produces 14,700 barrels per day of GTL products. The experience gained at Bintulu has been critical to the implementation of the GTL process at other plants.

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Shell GTL Fuel At a glance

Ease of use
In general, Shell GTL Fuel can be packaged, transported and stored using the same equipment, materials, and procedures as conventional diesel. Diesel vehicles can also be run on Shell GTL Fuel without engine or exhaust system modifications, which means that Shell GTL Fuel can be considered as a drop-in replacement for conventional diesel, allowing seamless introduction without investment in new vehicles or refuelling infrastructure.

Key benefits
Through all these tests and trials a large amount of local emissions data has been collected, covering a wide range of engine, vehicles, engines and after-treatment systems on the road today. Collectively, the local emissions tests have shown that Shell GTL Fuel can provide significant percentage local emissions benefits compared to conventional diesel.

Product characteristics
- Shell GTL Fuel is an innovative synthetic fuel produced from natural gas that can help reduce local emissions in conventional diesel. In addition, because GTL products are derived from natural gas, rather than crude oil, they can help diversify supplies to the liquid fuel market.
- Shell GTL Fuel is a premium quality product. Although it has broadly similar physical characteristics to conventional diesel, it has a much higher cetane number, higher mass calorific value, lower sulphur and aromatics, and a lower density.
- Product characteristics
  - Shell GTL Fuel is almost entirely paraffinic, and comprises hydrocarbon molecules of essentially only two types, normal-paraffins and iso-paraffins. It is essentially free from the unsaturated molecules, such as olefins (alkenes) and aromatics, which are present in conventional fuels. These unique properties enable more efficient combustion and lower vehicle local emissions.
  - Shell GTL Fuel can meet the needs of most temperate and cold climates. Its Cold Filter Plugging Point (CFPP) is typically in the range of -9°C to -20°C, depending on the requirements of the climate. Lower CFPP batches have also been produced.
- Successful worldwide experience
  - Over the past decade, Shell has conducted many field trials of Shell GTL Fuel in major cities around the world. These vehicle trials have tested the performance of Shell GTL Fuel over many months of real “on the road” conditions. The trials showed that the switch over from conventional diesel was easy and that vehicle performance was maintained. They have also helped to raise the awareness of GTL fuel amongst governments, automotive manufacturers and the general public in Europe, the USA and Asia.

As well as yielding local emissions benefits, Shell GTL Fuel is nontoxic, odourless, readily biodegradable and has a lower hazard rating. These characteristics further enhance its credentials and make Shell GTL Fuel intrinsically safer to transport, handle and use than conventional diesel. Since 2006, Shell has embarked on the global registration of Shell GTL Fuel using a new CAS number and product descriptor to differentiate this from crude oil-derived products. This enables the hazard properties of Shell GTL Fuel to be recognised thereby creating opportunities to promote its use in operational areas where “safer” (i.e. less hazardous) products are desirable. In addition to these benefits, Shell GTL Fuel has been shown to give engine noise benefits in some situations, due to its high cetane number.

In this material, “Shell GTL Fuel” means 100% GTL fuel which is branded and marketed under the Shell name.