



Shell
GTL

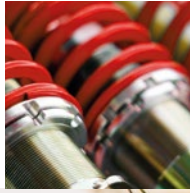
Performance Fluids

PURE PERFORMANCE
STARTS HERE



SHELL GAS TO LIQUID (GTL) PERFORMANCE FLUIDS ARE NEXT-GENERATION, HIGH-PURITY PARAFFINIC FLUIDS BASED ON GAS-TO-LIQUIDS TECHNOLOGY. THEIR UNIQUE SYNTHETIC COMPOSITION, WITH LOW AROMATICS CONTENT, IS DESIGNED TO ENHANCE PERFORMANCE OVER CONVENTIONAL SOLVENTS IN MANY APPLICATIONS.





EXCELLENT
PURITY
PROPERTIES
PERFORMANCE

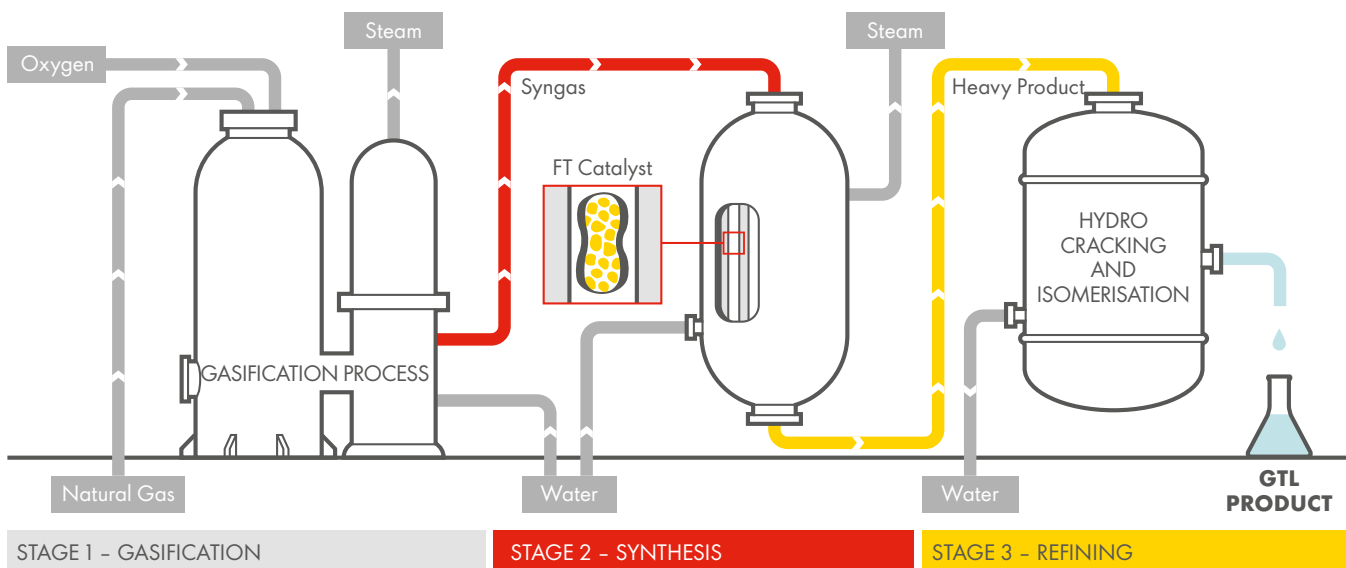
GAS-TO-LIQUIDS TECHNOLOGY: AT THE FOREFRONT OF INNOVATION

Shell GTL Performance Fluids are produced by a Gas-to-Liquids (GTL) process, which uses natural gas as a feedstock.

The basic chemistry behind the GTL process, known as Fischer-Tropsch synthesis, was developed in the 1920s by two German scientists, Franz Fischer and Hans Tropsch.

Taking this technology as their starting point, Shell technologists have worked for more than 35 years to refine the GTL process.

Work by Shell at the forefront of research into GTL technology and production has culminated in the Pearl GTL plant in Qatar. The plant is jointly owned by Shell and Qatar Energy and, as of 2013, is the world's largest source of GTL products. Shell holds more than 3,500 patents covering all aspects of the GTL process.



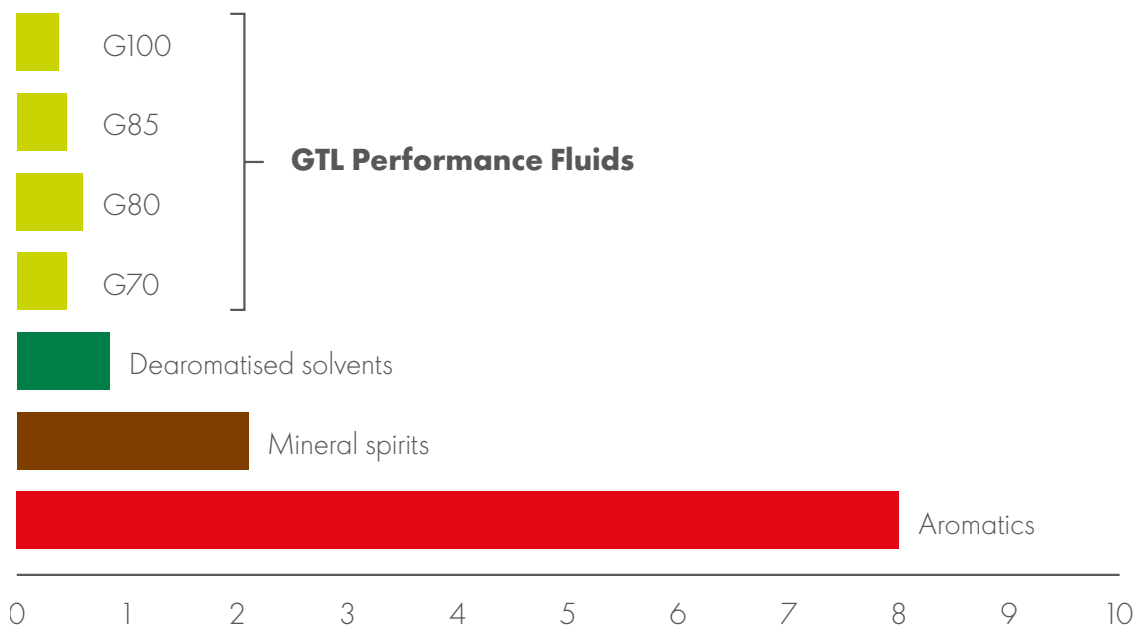
PREMIUM QUALITY PARAFFINIC FLUIDS WITH A UNIQUE SET OF CHARACTERISTICS

- **Reduced environmental impact:** low aromatic and low naphthenic content designed to promote better biodegradability, lower ecotoxicity and lower photochemical reactivity. The latter is designed to result in very low ozone formation potential.
- **High purity:** synthesised from methane gas, GTL Performance Fluids comprise only iso and normal paraffins. They contain very low amounts of impurities such as sulphur, olefins and polycyclic aromatics. They have a bright and clear appearance.
- **Low odour:** almost odourless, due to their low aromatic and low naphthenic content.
- **Synthetic:** GTL technology and gas feedstock are designed to provide a more stable, synthetic product with consistent composition.



CLEAR LIQUID PRODUCTS WITH VERY LOW SULPHUR AND AROMATICS

Approximate Maximum Incremental Ozone Reactivity values, g/mol



- Low photochemical reactivity
- Low Maximum Incremental Reactivity (MIR)



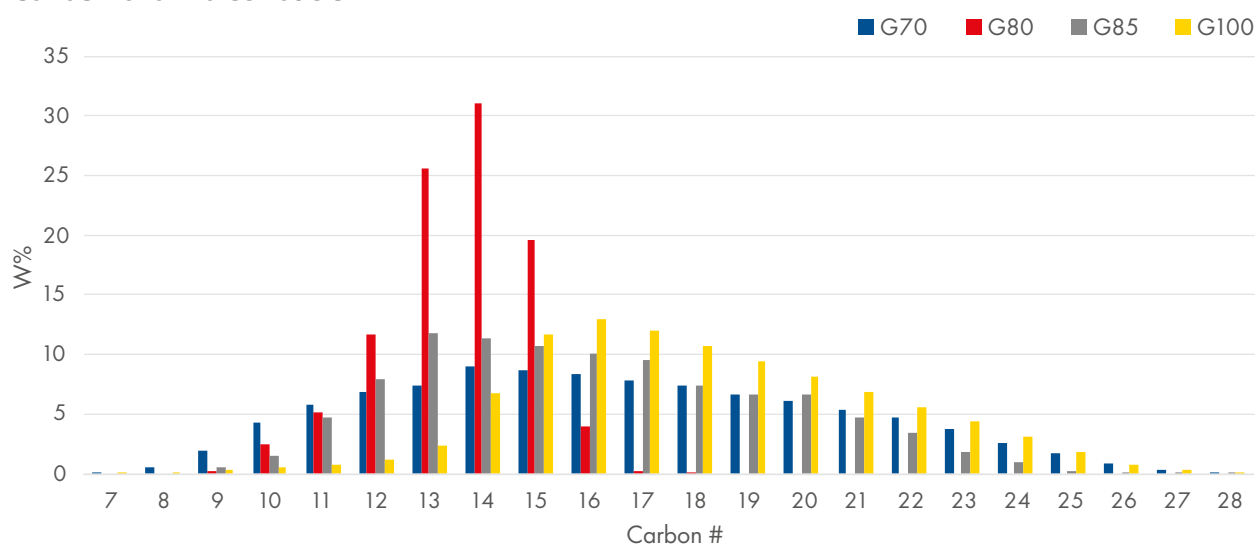
Performance Fluids

Series of high-purity paraffinic fluids

Some key properties with typical values

Property	Unit	Method	G70	G80	G85	G100
Distillation: Initial Boiling Point	°C	ASTM D86	177	200	198	237
Distillation: Dry Point	°C	ASTM D86	345	260	343	343
Flash Point	°C	ASTM D93	68	84	86	104
Aniline Point	°C	ASTM D611	95	87	95	98
Viscosity at 25°C	cSt	ASTM D445	2.6	1.8	2.9	3.5
Aromatics	%	GC	<0.02	<0.03	<0.02	<0.02

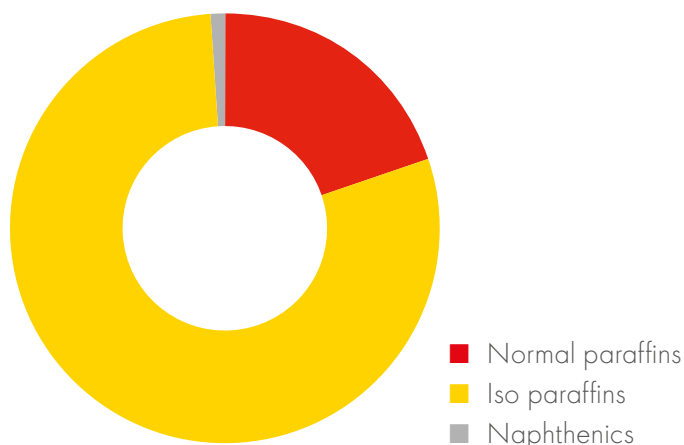
Carbon chain distribution



Typical composition of GTL Performance Fluids

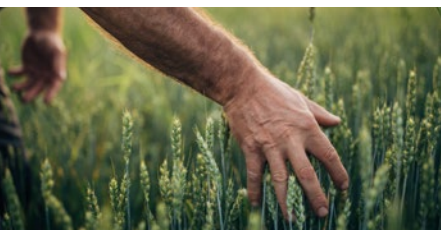
The iso- to normal-paraffinic ratio is approximately 80:20.

A small amount of naphthenic paraffins may further enhance performance in certain applications.





GTL PERFORMANCE FLUIDS: POTENTIAL FOR USE IN A WIDE RANGE OF APPLICATIONS



	PURITY	PROPERTIES
CROP PROTECTION PRODUCTS	<ul style="list-style-type: none"> Low aromatic and low naphthenic content Very low polycyclic aromatic hydrocarbon (PAH) levels High unsulphonated residue 	<ul style="list-style-type: none"> Very low odour Low pour point and viscosity High paraffinic content
WATER TREATMENT	<ul style="list-style-type: none"> Low aromatic and low naphthenic content Very low polycyclic aromatic hydrocarbon (PAH) levels Very low sulphur and other impurities 	<ul style="list-style-type: none"> Very low odour Low viscosity Low Eco Toxicity Chemically inert
ANFO EXPLOSIVES	<ul style="list-style-type: none"> Low aromatic and low naphthenic content Very low polycyclic aromatic hydrocarbon (PAH) levels Very low sulphur and other impurities 	<ul style="list-style-type: none"> Very low odour Range of flash points up to 100°C Low viscosity Low Eco toxicity Consistent product quality
METAL WORKING FLUIDS	<ul style="list-style-type: none"> Low aromatic content Low naphthenic content Very low polycyclic aromatic hydrocarbon (PAH) levels Very low sulphur and other impurities 	<ul style="list-style-type: none"> Non-skin, non eye-irritant Good thermal conductivity Narrow boiling range Low viscosity Very low odour Very low (eco) toxicity
AEROSOLS	<ul style="list-style-type: none"> Low aromatic and low naphthenic content Very low polycyclic aromatic hydrocarbon (PAH) levels Very low sulphur and other impurities 	<ul style="list-style-type: none"> Low viscosity Low odour Consistent product quality Low surface tension

These are commonly known potential applications for conventional refinery solvents products. Assessment of potential applications for Shell GTL Performance Fluids and Solvents is based upon Shell Chemicals' laboratory testing and subsequent calculations. A customer shall make its own assessment to determine a product's suitability for a particular application or purpose. Shell Chemicals makes no warranties, either express or implied, that any products shall be merchantable or fit for any particular application or purpose.

* Performance compared to conventional products

PERFORMANCE*

- Readily biodegradable
- Low phyto-toxicity
- Low (eco) toxicity
- Low skin irritancy

- Good biodegradability
- No negative impact on polymerization reaction

- Controllable blasts
- Improved stability vs diesel fuel oil
- Long explosive shelf life
- Excellent viscosity aid
- Non-toxic and readily biodegradable
- Reduced emissions of toxic fumes
- Increased safety

- Readily biodegradable
- Low misting
- Low foaming
- No staining
- High flash point

- Readily biodegradable
- Low eco- and phytotoxicity
- Good spreadability
- Non-aggressive

Additional potential applications may include:

Aluminium rolling oils

BBQ lighter fluids
and cubes

Cleaning products

Defoamers

Fuel additives

Insecticides/repellents

Metal cleaning

Mining

Polymer processing fluids

Printing inks

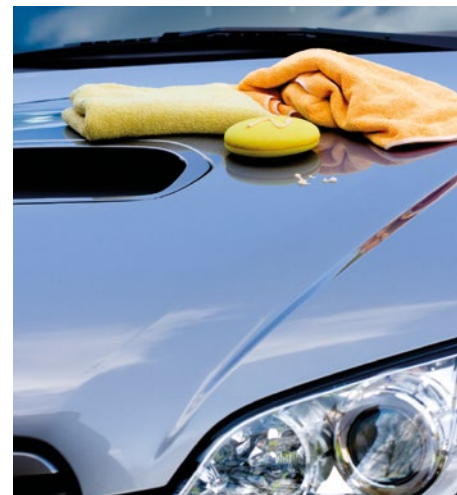
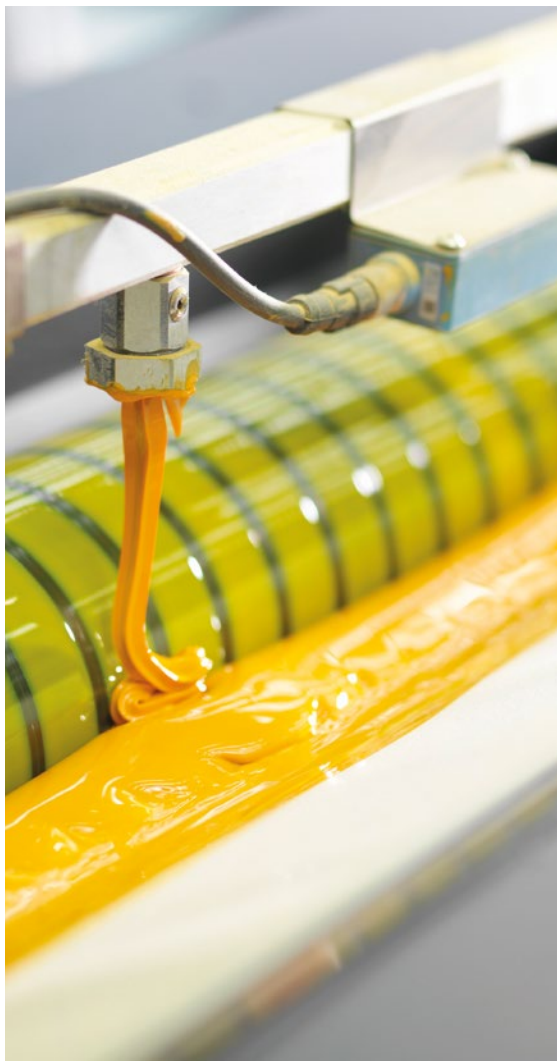
Rust preventatives

Spinning Oils

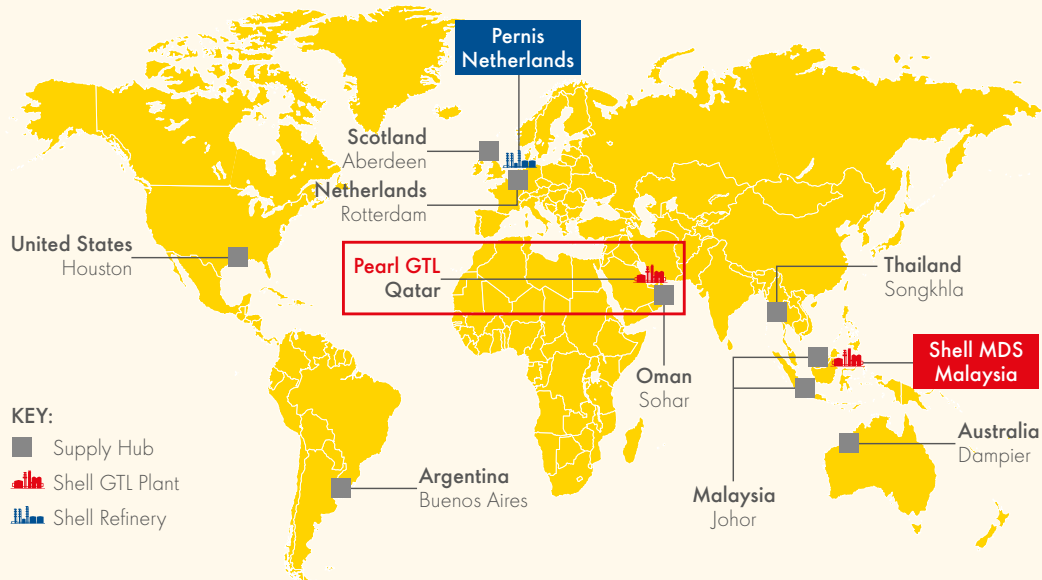
Timber treatment

Transformer/Electrical

Discharge Machining
(EDM) fluids



GLOBAL REACH



■ Shell has regional hubs **globally** for its GTL Performance Fluids.

■ Large distributor network with **strong supply chain** experience to get the product to our customers where and when they need it.

■ Strong **customer service** coverage globally for instant support when needed.

WORKING WITH SHELL PERFORMANCE FLUIDS

Continuous innovation for changing customer needs

GTL Performance Fluids are yet another example of Shell's focus on technology and innovation in order to meet our customers' needs and help them compete in the marketplace.

A broad product line

Our wide range of GTL Performance Fluids enables us to cover most – if not all – of our customers' fluids requirements. In this way we can help to rationalise and reduce the costs of procurement.

Global security of supply

Shell is a leading global supplier of solvents and fluids with strategically-located plants.

Consistency of product quality

Long-term production experience and development of proprietary Shell processes deliver products of high quality and consistency.

Multiple sales channels

By delivering both directly to customers and via our distributor network, we have access to the options that will enable us to best meet the individual needs of our customers.

Experienced support staff

Shell employees have in-depth knowledge of their fluids products, applications, and known health, safety and environment issues. Local sales staff are trained and experienced to identify and meet customer business needs.

CROP PROTECTION PRODUCTS,
WATER TREATMENT, ANFO EXPLOSIVES,
METAL WORKING FLUIDS, AEROSOLS.





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