



**Shell**  
**GTL Fluids & Solvents**  
PURE PERFORMANCE  
STARTS HERE



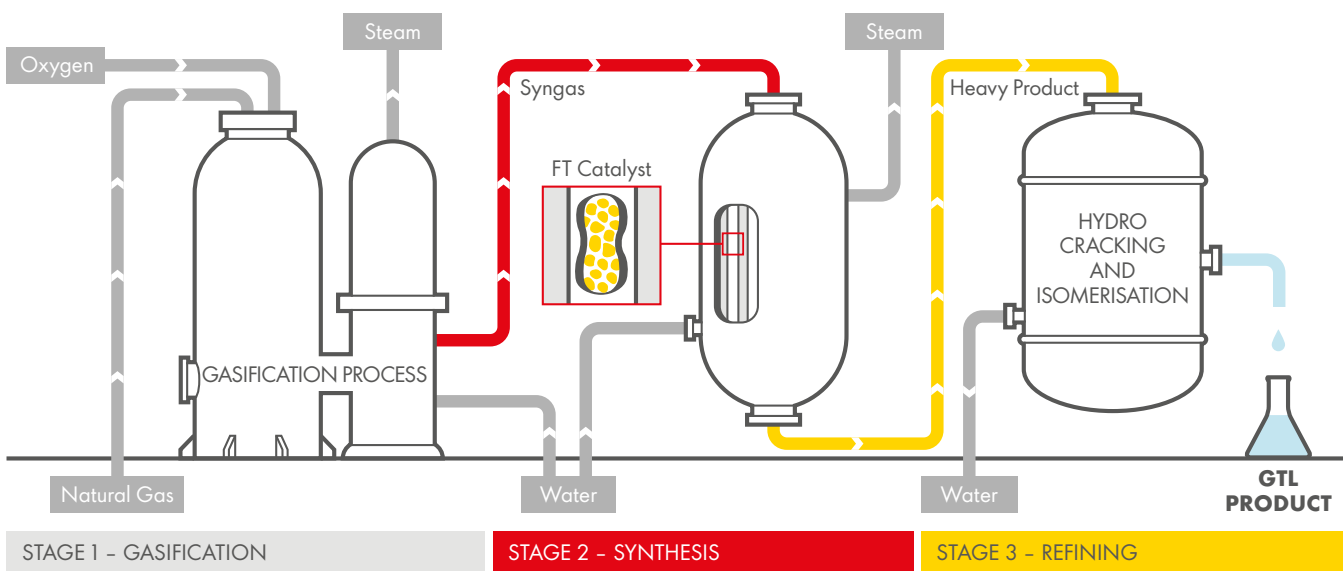
# GAS-TO-LIQUIDS TECHNOLOGY: AT THE FOREFRONT OF INNOVATION

## Shell GTL Fluids and Solvents 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 Petroleum 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 AND SOLVENTS WITH A UNIQUE SET OF CHARACTERISTICS

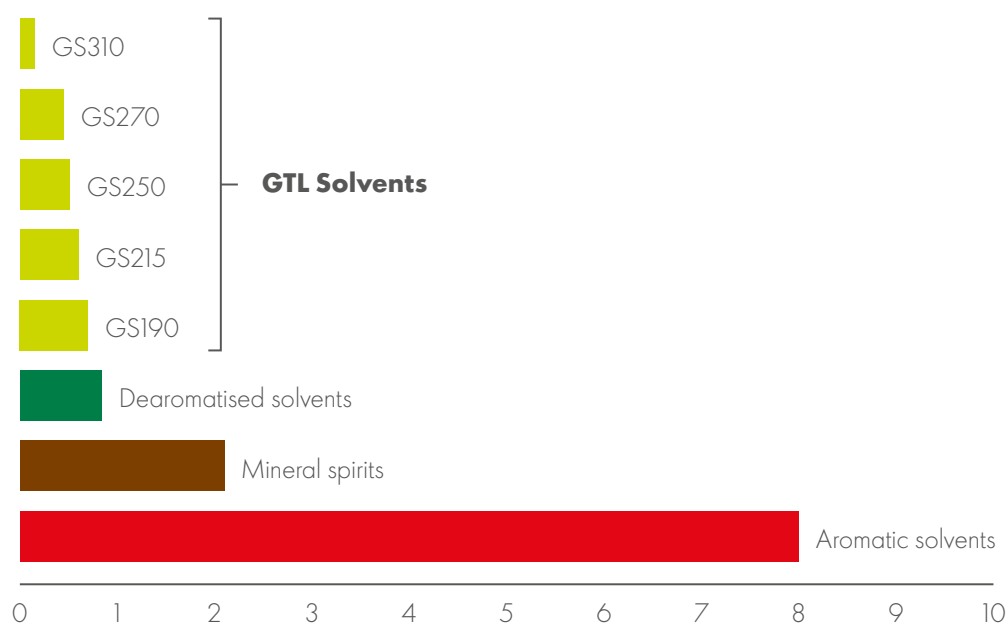
- **Reduced environmental impact:** very low aromatic and low naphthenic content designed to promote better biodegradability, lower ecotoxicity and lower photochemical reactivity. The latter is designed to result in very low ozone formation potential.
- **High purity:** synthesised from methane gas, GTL Fluids and Solvents 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 very 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

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

Approximate Maximum Incremental Ozone Reactivity values, g/mol



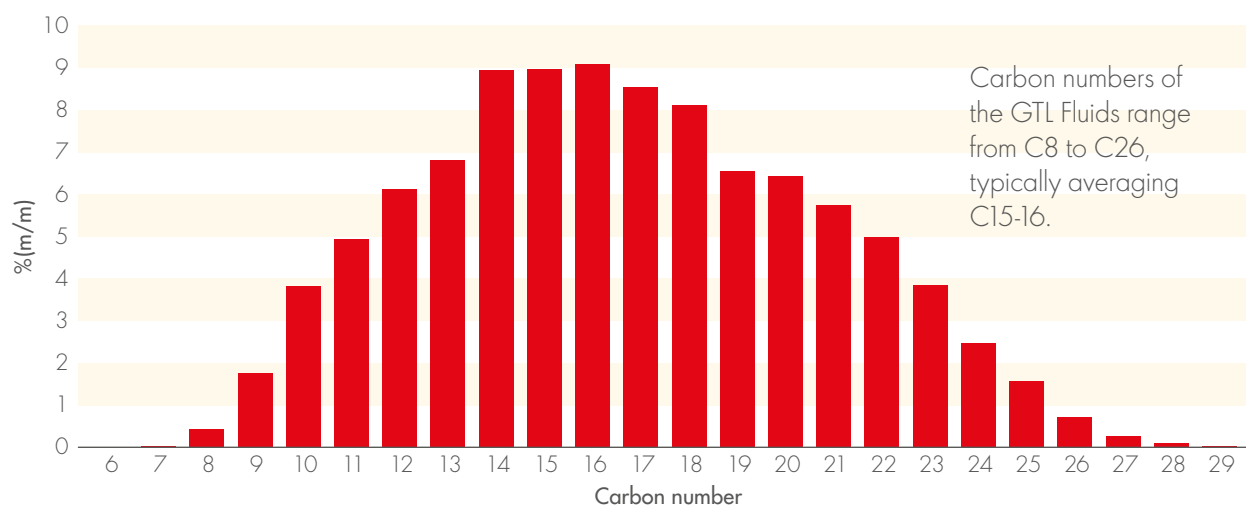
# Shell GTL Fluids

Series of high-purity paraffinic fluids

## Some key properties with typical values

Property	Unit	Method	G70	G85
Distillation: Initial Boiling Point	°C	ASTM D86	179	198
Distillation: Dry Point	°C	ASTM D86	343	343
Flash Point	°C	ASTM D93	73	86
Aniline Point	°C	ASTM D611	95	95
Viscosity at 40°C	cSt	ASTM D445	2.6	2.9
Aromatics	ppm	GC	<500	<500

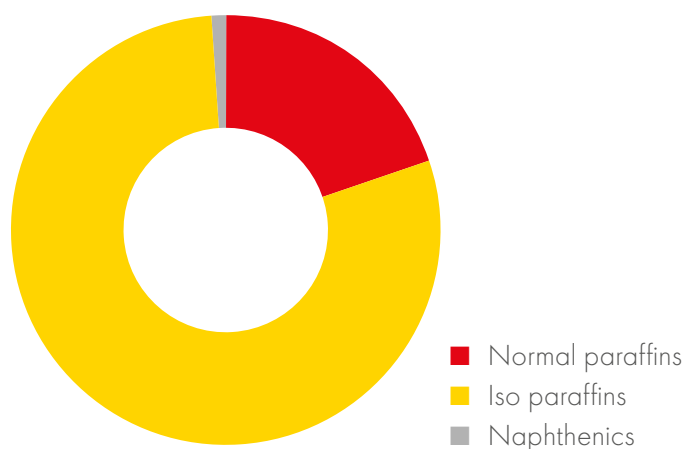
## Typical carbon number distribution of GTL Fluids



## Typical composition of GTL Fluids

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

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



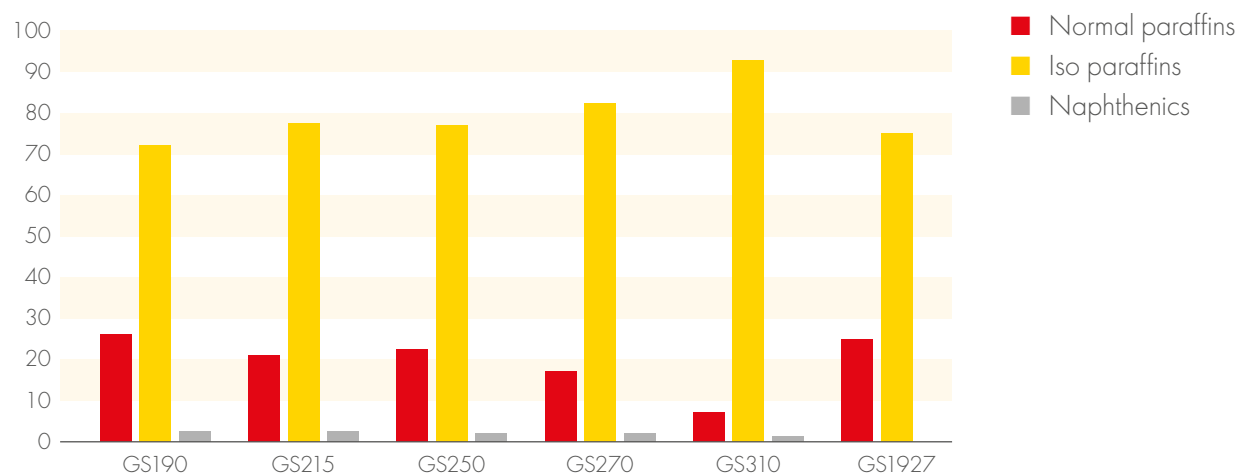
# Shell GTL Solvents

Series of high-purity paraffinic solvents

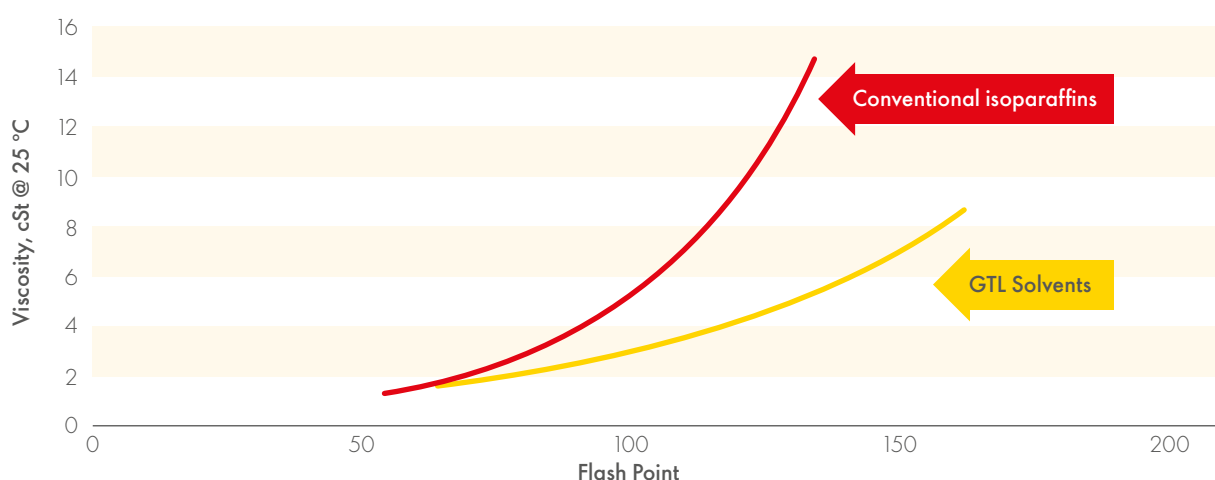
## Some key properties with typical values

Property	Unit	Method	GS190	GS215	GS250	GS270	GS310	GS1927
Distillation: Initial Boiling Point	°C	ASTM D86	193	220	245	272	303	190
Distillation: Dry Point	°C	ASTM D86	215	244	272	300	353	260
Flash Point	°C	ASTM D93	65	91	112	133	162	72
Aniline Point	°C	ASTM D611	82	87	92	97	105	87
Viscosity at 40°C	cSt	ASTM D445	1.3	1.9	2.5	3.6	6	1.7
Aromatics	ppm	GC	<5	<5	<5	<5	<5	<5

## Typical composition of GTL Solvents



## Relative viscosity of GTL Solvents and conventional iso-paraffinic solvents



# GTL FLUIDS AND SOLVENTS: POTENTIAL FOR USE IN A WIDE RANGE OF APPLICATIONS

		PURITY	PROPERTIES
	<b>CROP PROTECTION PRODUCTS</b>	<ul style="list-style-type: none"> <li>Very low aromatic and low naphthenic content</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>High unsulphonated residue</li> </ul>	<ul style="list-style-type: none"> <li>Very low odour</li> <li>Low pour point and viscosity</li> <li>Range of flash points up to 160°C</li> <li>High paraffinic content</li> </ul>
	<b>SI-SEALANTS</b>	<ul style="list-style-type: none"> <li>Very low aromatic content</li> <li>Low naphthenic content</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>Very low sulphur and other impurities</li> </ul>	<ul style="list-style-type: none"> <li>Low viscosity</li> <li>Low pour point</li> <li>Very low odour and colour</li> <li>Low evaporation rate</li> <li>Very low (eco) toxicity</li> </ul>
	<b>BASE FLUIDS FOR DRILLING MUDS</b>	<ul style="list-style-type: none"> <li>Very low aromatic and low naphthenic content</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>Very low sulphur and other impurities</li> </ul>	<ul style="list-style-type: none"> <li>Low viscosity</li> <li>Low pour point</li> <li>Range of flash points up to 160°C</li> </ul>
	<b>MOULD RELEASE PRODUCTS</b>	<ul style="list-style-type: none"> <li>Very low aromatic and low naphthenic levels</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>Very low sulphur and other impurities</li> </ul>	<ul style="list-style-type: none"> <li>Low viscosity</li> <li>Low vapour pressure</li> <li>Low surface tension</li> <li>Very low odour</li> </ul>
	<b>METAL WORKING FLUIDS</b>	<ul style="list-style-type: none"> <li>Very low aromatic content</li> <li>Low naphthenic content</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>Very low sulphur and other impurities</li> </ul>	<ul style="list-style-type: none"> <li>Non-skin, non eye-irritant</li> <li>Good thermal conductivity</li> <li>Narrow boiling range</li> <li>Low viscosity</li> <li>Very low odour</li> <li>Very low (eco) toxicity</li> </ul>
	<b>HEATING AND LIGHTER FLUIDS, LAMP OILS</b>	<ul style="list-style-type: none"> <li>Very low aromatic and low naphthenic content</li> <li>Very low polycyclic aromatic hydrocarbon (PAH) levels</li> <li>Very low sulphur and other impurities</li> </ul>	<ul style="list-style-type: none"> <li>Higher flash points</li> <li>Higher explosion limits</li> <li>Very low fluid odour</li> <li>Low viscosities</li> <li>Low pour points</li> </ul>

These are commonly known potential applications for conventional refinery solvents products. Assessment of potential applications for Shell GTL 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

- No shrinkage or cracking
- High compatibility with silicone resins and other ingredients

- Readily biodegradable
- Low aquatic toxicity
- Synthetic, type III base fluid
- Low skin irritancy

- Readily biodegradable
- Low skin irritancy
- Excellent spreadability and release properties
- Non-staining
- Long-lasting films

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

- High smoke point, low sooting
- Low odour during ignition and burning
- Better flame stability

## Additional potential applications include:

Aerosols

Bitumen flux

Aluminium rolling oils

ANFO explosives

BBQ lighter fluids  
and cubes

Cleaning products

Cosmetics, personal care

Defoamers

Fuel additives

Glasshouse fuels

Metal cleaning

Mining

Paints

Polymer processing fluids

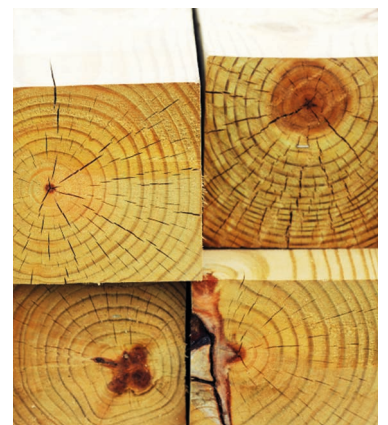
Printing inks

Timber treatment

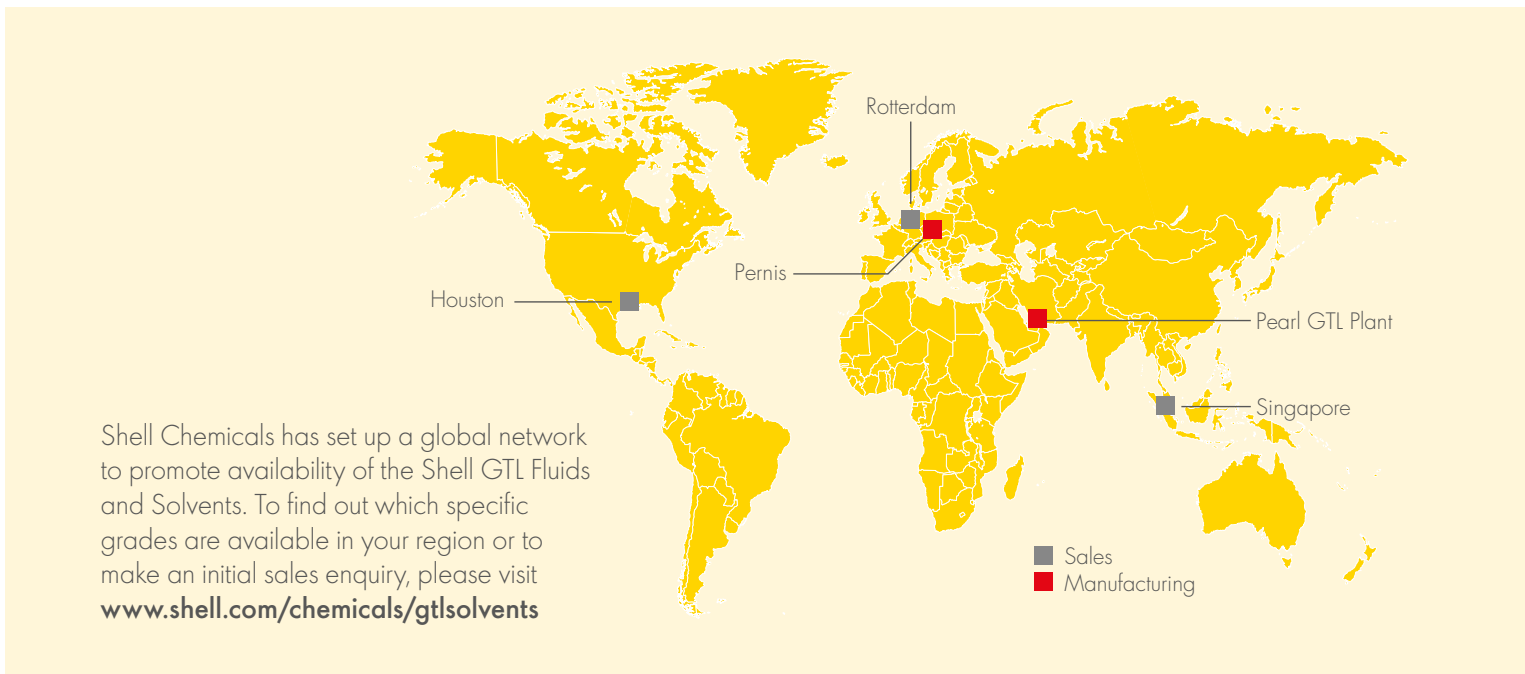
Transformer/Electrical  
Discharge Machining  
(EDM) fluids

Water treatment products

Wood treatment fluids



# GLOBAL REACH



## WORKING WITH SHELL CHEMICALS

Shell Chemicals has a long history dating back more than 70 years serving solvents customers. We have the key factors in place to meet customer needs.

### **Continuous innovation for changing customer needs**

GTL Fluids and Solvents 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 solvents enables us to cover most - if not all - of our customers' solvents requirements. In this way we can help to rationalise and reduce the costs of procurement.

### **Global security of supply**

Shell Chemicals are leading global suppliers of solvents, with strategically-located plants and a record of reliable supply.

### **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 Chemicals people have in-depth knowledge of their solvents products, applications, and known health, safety and environment issues. Local sales staff are trained and experienced to identify and meet customer business needs.



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