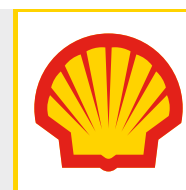




Shell Ondina X



High-quality medical white oils based
on gas to liquids (GTL) technology

NEXT GENERATION PROCESS OILS



SHELL ONDINA X IS A RANGE OF TOP-TIER MEDICAL WHITE OILS BASED ON GTL TECHNOLOGY. IT OFFERS A HIGH LEVEL OF PURITY AND EXCELLENT PERFORMANCE IN SELECTED APPLICATIONS, CREATING OPPORTUNITIES TO ENHANCE YOUR PRODUCTS AND OPERATIONS.

TECHNOLOGY WORKING FOR YOU

SHELL GTL TECHNOLOGY OPENS EXCITING NEW OPPORTUNITIES FOR THE NEXT GENERATION OF PROCESS OILS.

Shell's GTL-based process oils have a uniform chemical structure because they are manufactured from hydrocarbons derived from natural gas rather than crude oil (Figure 1).

Shell Ondina X is a range of next generation medicinal white oils that have a specialised molecular structure. This enables them to have low viscosity while exhibiting a carbon chain distribution and evaporation loss characteristics that are comparable to a higher viscosity conventional medicinal white oil (Figure 2 and Table 1).

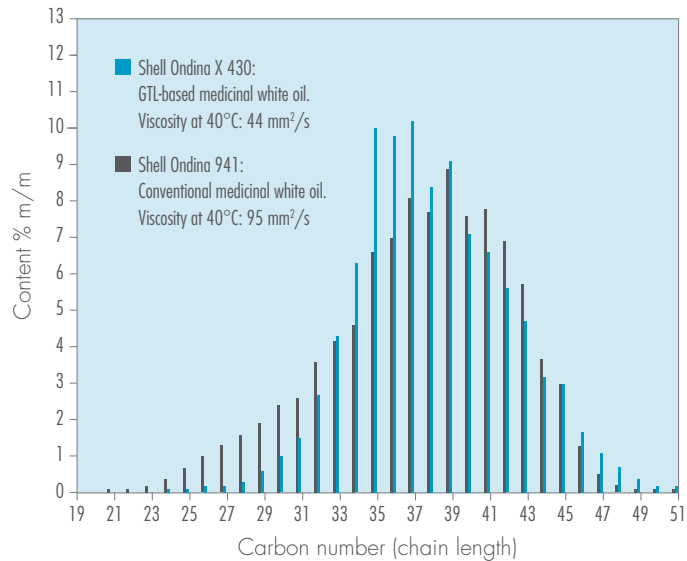


Figure 2: The carbon number distribution of Shell Ondina X 430 is comparable to that of a conventional medicinal white oil with a higher viscosity (Shell Ondina 941). Source: Shell.

	Evaporation loss (weight %)
Shell Ondina X 430	2.4
Shell Ondina 941	2.3

Table 1: Noack (DIN 51581) test data confirm that Shell Ondina X 430 oil has similar evaporation characteristics to a conventional medicinal white oil with a higher viscosity (Shell Ondina 941). Source: Shell.

The data shown for Shell Ondina X grades are those typical of current production. While future production will conform to Shell's specification, variation in these characteristics may occur.

FROM NATURAL GAS TO LIQUID ENERGY

How Shell creates products from natural gas that would otherwise be produced from oil.

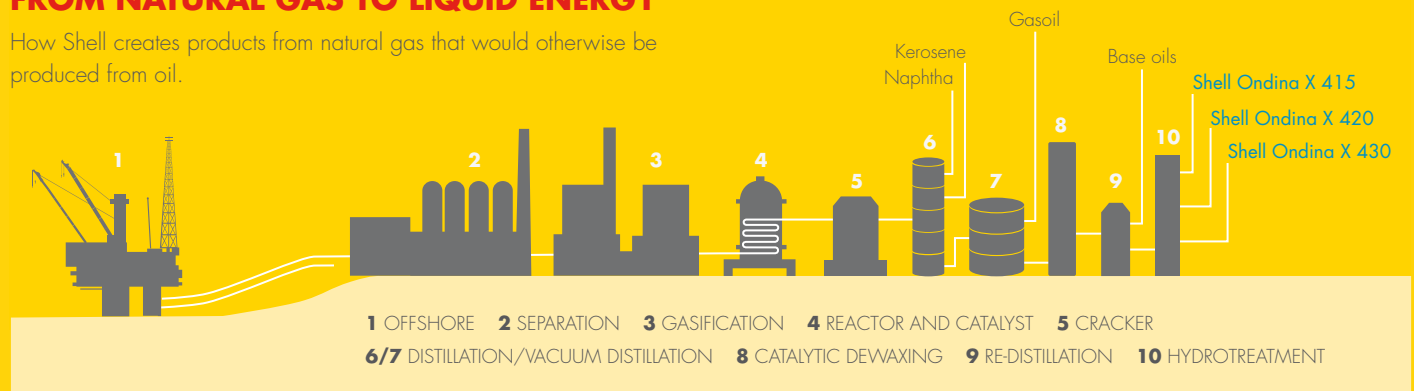


Figure 1: The GTL process converts clean-burning natural gas into cleaner-burning fuels and high-quality base oils through the Fischer-Tropsch process. GTL base oils are further processed to produce high-quality medicinal white oils. Source: Shell.

HIGH PURITY, HIGH PERFORMANCE

SHELL ONDINA X OILS ARE HIGH-QUALITY MEDICINAL WHITE OILS THAT OFFER AN EXCEPTIONAL LEVEL OF PURITY AND VALUABLE PERFORMANCE ADVANTAGES.

Shell Ondina X oils have an isoparaffinic hydrocarbon structure and they are produced through a hydrotreatment process. They **contain virtually no sulphur, nitrogen or aromatics**. This purity and chemistry provide qualities that are essential to many applications, for instance, they are colourless and almost odourless.

In addition, Shell Ondina X oils meet the stringent medicinal white oil **purity requirements** of the major international pharmacopoeias, including the *European Pharmacopoeia*, the *United States Pharmacopoeia*, the *Chinese Pharmacopoeia* and the *Indian Pharmacopoeia*.

Shell Ondina X oils offer an outstanding combination of characteristics that can facilitate enhanced performance in the applications in which they are used. These properties include

- **low volatility**
- **low pour point**
- **high flash point**
- **high viscosity index**
- **outstanding UV stability (Figure 3) and thermal stability (Table 2).**

Few other conventional process oils can offer the same combination of properties.

	Saybolt colour at 0 h	Saybolt colour at 20 h
Shell Ondina 919	30	27
Shell Ondina 941	30	26
Shell Ondina X 430	30	30

Table 2: Thermal stability tests (Henkel test: 20 h at 160°C). Source Shell.



Figure 3: UV stability test (lightbox). Source Shell.

Shell Ondina 919: conventional medicinal white oil
Viscosity at 40°C: 21.5 mm²/s
Shell Ondina 941: conventional medicinal white oil
Viscosity at 40°C: 95 mm²/s
Shell Ondina X 430: GTL-based medicinal white oil
Viscosity at 40°C: 44 mm²/s



SHELL GTL TECHNOLOGY

GTL technology is the product of almost 40 years of research and technology driven by Shell. The technology enables large-scale production of base oils for the manufacture of premium, finished lubricants and process oils. The basic technology behind the GTL process, known as Fischer-Tropsch, was developed by German scientists in the 1920s and refined by Shell's proprietary technology.

This technology has been brought to life in the Pearl GTL plant in Qatar, a joint development between Qatar Petroleum and Shell, which has a capacity of 260,000 barrels oil equivalent a day. This is the world's largest source of GTL products, including low-emission transport fuels, valuable chemical feedstocks and premium base oils. Shell holds more than 3,500 patents covering all stages of the Pearl GTL process.

VALUE DELIVERED TO YOU

THE HIGH PURITY OF **SHELL ONDINA X** OILS CAN HELP TO ENHANCE THE QUALITY OF YOUR PRODUCTS.

UNDERSTANDING YOUR NEEDS

Shell is one of the leading process oil manufacturers and has more than 25 years' experience in the process oils business. We recognise the crucial role that process oils play in your products and operations. We also understand that the purity of these oils is paramount, and that using a process oil with a high and consistent quality can have a major bearing on the success of your business.

Shell Ondina X oils have been designed in response to customer needs and could be **game changers for your products and operations.**

PORTFOLIO RANGE

The Shell Ondina X portfolio includes

- **Shell Ondina X 415***
- **Shell Ondina X 420***
- **Shell Ondina X 430**
- **Shell Ondina X 432** (specifically developed to meet EU regulation No. 10/2011, which makes it suitable for food packaging and other similar applications).

Your Shell representative can help you to identify the most appropriate grade for your application.



GLOBAL REACH

Shell Ondina X oils are supplied to major markets around the world. If you are interested in unlocking valuable performance advantages, talk to us about the benefits that Shell Ondina X could have for your business.



*According to the Regulation (EC) No 1272/2008 on Classification, Labeling and Packaging of substances and mixtures/Globally Harmonised System (CLP/GHS), owing to their low viscosity (<20.5 mm/s at 40°C), Shell Ondina X 415 and Shell Ondina X 420 have a category 1 aspiration hazard classification.



APPLICATIONS

Shell Ondina X oils are especially suitable for applications that require high purity and high performance. In particular, they are the product of choice for customers in the following sectors:

- adhesives
- cosmetics and personal care
- defoamers
- rubber
- thermoplastic elastomers.

Moreover, because of the advantages and opportunities that Shell Ondina X oils offer, new applications are being identified.

OUR EXPERIENCED PROCESS OILS EXPERTS CAN WORK WITH YOU TO ANALYSE YOUR NEEDS AND PROPOSE SOLUTIONS TO HELP SOLVE YOUR PROBLEMS. THE RESULT? PURITY THAT **DELIVERS VALUE TO YOUR OPERATIONS.**

COMPREHENSIVE PRODUCT AND SERVICE PROVISION

Shell is constantly investing to develop better process oils to support your business.

Whatever your needs and applications, Shell can provide a full range of process oils, including

- naphthenic oils: Shell Gravex and Shell Edelex
- paraffinic oils: Shell Catenex and Shell Flavex
- white oils (conventional and GTL based): Shell Ondina and Shell Risella.

In addition, Shell offers expert consultation and technical advice to support your business needs.

