



# THAIOIL GROUP

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## Product Catalog



website

# COMPANY PROFILE

Thaioil is Thailand's largest refinery and supplier of petroleum products. Founded in 1961, we operate one of the leading efficient refineries in Asia Pacific with the current capacity of 275,000 barrels per day.

Thaioil operates under the Operational Excellence principle, operating as an integrated group of businesses in oil refinery, petrochemicals and lube base oil with supporting businesses, e.g. power generation, solvents, renewable energy generation, LAB: an intermediate in the production of surfactants, business in the area of International Business Center and Treasury Center, as well as recruitment services for Thaioil and Subsidiaries.

Thaioil leads the Thai refinery industry through a well-planned and integrated production process, yielding optimum efficiency. Our product quality are high, rated in the top quartile of refineries in Asia Pacific, at lower production costs, giving Thaioil a recognized competitive advantage.



## Thaioil Group's Business and Products are Comprised of Following Sectors



Thai Oil Public Company Limited

Petroleum Business



Thai Paraxylene Company Limited

Petrochemicals Business



Thai Lube Base Public Company Limited

Lube Base Oil Business



LABIX Company Limited

Linear Alkyl Benzene Business



Topnext International Company Limited

Solvent & Chemical Business



Sak Chaisidhi Company Limited



TOP Solvent (Vietnam) Limited liability Company



PT Tirta Surya Raya (Indonesia)



JSKem Pte Ltd (Singapore)



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# PETROLEUM

Thaioil refinery has a petroleum production of approximately 12,000 million liters per year or about 21% of the nation's overall production and capable of meeting domestic demand for petroleum at 35%. The process we take ensures Thaioil is number one producer of petroleum products in Asia-Pacific.



## GASOLINE

The Company's refinery is the first one in Thailand to produce Euro IV standard gasoline, with certain changes in the oil product specifications including a decrease in the amount of Sulphur from 500 ppm to a maximum of 50 ppm, which reduces sulphur oxide (SOx), carbon monoxide, and nitrogen oxide emissions.

Commercial Name	Key Property	Specifications	Test Method
<b>UG95</b>	RON	95 Min	ASTM D 2699
<b>Gasoline 95</b>	RVP	62 kPa Max	ASTM D 4953
<b>Mogas 95 RON</b>	SULFUR	50 PPM Max	ASTM D 2622
<b>UG91</b>	RON	91 Min	ASTM D 2699
<b>Gasoline 91</b>	RVP	70 kPa Max	ASTM D 4953
<b>Mogas 91 RON</b>	SULFUR	50 PPM Max	ASTM D 2622
<b>UG92</b>	RON	92 Min	ASTM D 2699
<b>Gasoline 92</b>	RVP	70 kPa Max	ASTM D 4953
<b>Mogas 92 RON</b>	SULFUR	50 PPM Max	ASTM D 2622
<b>GB95</b>	RON	91 Min	ASTM D 2699
<b>G-Base 95</b>	RVP	54.5 kPa Max	ASTM D 4953
<b>Gasoline Base 95</b>	SULFUR	50 PPM Max	ASTM D 2622
<b>GB91</b>	RON	87 Min	ASTM D 2699
<b>G-Base 91</b>	RVP	54.5 kPa Max	ASTM D 4953
<b>Gasoline Base 91</b>	SULFUR	50 PPM Max	ASTM D 2622
<b>Gasohol 91</b>	RON	91 Min	ASTM D 2699
	RVP	62 kPa Max	ASTM D 4953
	Sulphur	50 PPM Max	ASTM D 2622
	Ethanol	10% Max	ASTM D4815 / D 6839

Commercial Name	Key Property	Specifications	Test Method
Gasohol 95	RON	91 Min	ASTM D 2699
	RVP	62 kPa Max	ASTM D 4953
	Sulphur	50 PPM Max	ASTM D 2622
	Ethanol	10% Max	ASTM D4815 / D 6839
Gasohol E20, E20	RON	95 Min	ASTM D 2699
	RVP	64 kPa Max	ASTM D 4953
	Sulphur	50 PPM Max	ASTM D 2622
	Ethanol	20% Max	ASTM D4815 / D 6839



## SULPHUR

Commercial Name	Key Property	Specifications	Test Method
Sulphur	Purity	99.5 Min	SMS 754-85
Molten Sulphur	Mineral Matter	-	SMS 754-85
Liquid Sulphur	Organic Matter	-	SMS 754-85
	Acidity	0.01 Max	SMS 754-85
	Moisture Content	0.05 Max	SMS 754-85



## NAPHTHA

Commercial Name	Key Property	Specifications	Test Method
Light Naptha	RON	70 Min	ASTM D 2699
	RVP	13 PSI Max	ASTM D 6378
	Sulphur	8 PPM Max	ASTM D 5453/ D 2622
	Mercury	5 wt. PPB Max	UOP938
Heavy Naptha	Density	0.73—0.78 KG/L	ASTM D 4052
	N + A	35% Vol Min	ASTM D 6839
	Sulphur	35 PPM Max	ASTM D 5453/ D 2622



## GASOIL

We are Thailand's first producer and distributor of Euro IV standard diesel where the sulphur content is 7 times lower than that in the previous standards. This helps reduce sulphur oxide (SOx), carbon monoxide, and nitrogen oxide emissions, as well as soot and lampblack, into the atmosphere. It further increases the performance of diesel engines.

Commercial Name	Key Property	Specifications	Test Method
<b>Gasoil 50 ppm</b>	Density @ 15°C	0.81-0.87	ASTM D 4052
<b>Gasoil 0.005% Sulphur</b>	ASTM Color	2 Max	ASTM D 1500
<b>High Speed Diesel</b>	Cetane Number	50 Min	ASTM D 613
<b>High Speed Diesel (Base), B0</b>			
<b>Gasoil 500 ppm</b>	Density @15°C	0.81-0.87	ASTM D 4052
<b>Gasoil 0.05% Sulphur</b>	ASTM Color	4 Max	ASTM D 1500
<b>High Speed Diesel</b>	Cetane Number	50 Min	ASTM D 613
<b>Fisher Gasoil</b>	Total Sulphur content	0.7% Max	ASTM D 2622
<b>Gas oil 0.7% Sulphur</b>	Flash Point	60 P Mcc. Min	ASTM D 93
	Density @ 15°C	1.8-4.1	ASTM D 4052
	ASTM Color	Green	ASTM 2392 or visual
	Cetane Number	47 Min	ASTM D 613



## LPG

It is a type of gas that has been liquefied for convenience in storage and transportation. It is used for cooking as well as in cars and industrial factories.

Commercial Name	Key Property	Specifications	Test Method
<b>LPG</b>	Vapour Pressure @ 37.8 °C	1380 kPa Max	ASTM D 1267
	95% Boiling Point @ 2.2 °C	760 mmHg Max	ASTM D 1837
	Copper Strip Corrosion	No.1	ASTM D 1838



# JET/KEROSENE

Commercial Name	Key Property	Specifications	Test Method
<b>Jet A-1</b>	Flash Point, Abel	38.0°C Min	IP170
<b>Aviation Fuel</b>	Saybolt Color	+20 Min	ASTM D 156
<b>Aviation Turbine</b>	Mercaptan Sulphur	0.003% wt Max	ASTM D 3227
<i>DEF STAN 91-091 Issue 12, Sept 2020</i> <i>AFQRJOS Issue 32, Nov 2020</i>			
<b>JP 8</b>	Particulate contamination	1.0 mg/L Max	ASTM D 5452
	Final Boiling Point	300°C Max	ASTM D 86
	Flash Point, Abel	38.0°C Min	IP 170
	Freezing Point	-47°C Max	ASTM D2386
	Viscosity	8.0 mm <sup>2</sup> /sMax	ASTM D445
<b>Kerosene</b>	Final Boiling Point	300°C Max	ASTM D 86
	Flash Point, Abel	38.0°C Min	IP 170






## FUEL OIL

1. Fuel Oil A (FOA) is transparent with a low viscosity of 80 centistokes at 50°C and low sulphur content. Suitable for use with clean-fired equipment such as that used in tile manufacture.
2. Fuel Oil C (FOC) has a moderate viscosity of 180 centistokes at 50°C with a sulphur content of 2% or less according to its weight. It is used in medium to large factories to power engines or steam turbines to generate electricity, furnaces for metal melting and making cement.
3. Bunker Fuel, 3.5% Sulphur and Fuel oil IMO 0.5% has a high viscosity of 380 centistokes and can be used to power ocean liners. The sulphur content can be a maximum of 0.5%, 3.5% or 4.0% according to its weight.

Commercial Name	Key Property	Specifications	Test Method
<b>FOA</b>	Sulphur	2% Max	ASTM D 4294
<b>FO 2% Sulphur 80cSt</b>	Density @15°C	0.985 Max	ASTM 4052
	Viscosity, Kinematic @ 40°C	7-80 mm <sup>2</sup> /s Max	ASTM D 445
<b>FOC</b>	Sulphur	2% Max	ASTM 4294
<b>FO 2% Sulphur 180cSt</b>	Density @15°C	0.990 Max	ASTM D 4052
	Viscosity, Kinematic @ 50°C	81-180 mm <sup>2</sup> /s Max	ASTM D 445
	Pourpoint	24C Max	A ASTM D 97
<b>Bunker 3.5%</b>	Sulphur	3.5% Max	ASTM D 4294
<b>FO 3.5% Sulphur</b>	Aluminium (Al) + Silicon (Si)	80 Max	IP 501
	Density @15°C	0.990 Max	ASTM D 4052
	Viscosity, Kinematic @ 50°C	380 mm <sup>2</sup> /s Max	ASTM D 445
<b>FO IMO 0.5%</b>	Sulphur	0.5 % Max	ASTM D 4294
<b>VLSFO</b>	Aluminium (Al) + Silicon (Si)	60 Max	IP 501
<b>FO 0.5%S</b>	Density @15°C	0.990 Max	ASTM D 4052
	Viscosity, Kinematic @ 50°C	180 mm <sup>2</sup> /s Max	ASTM D 445

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# LUBE BASE



## BASE OIL

Lube base oil is a product of crude oil distillation which has gone through a quality improvement process to become high-quality pure lube base oil.

Commercial Name	Key Property	Specifications	Test Method
<b>SN 150</b>	Kinematic Viscosity @ 100°C	4.75–5.25 mm <sup>2</sup> /s	ASTM D 445
	Pour Point	-9°C	ASTM D 97
	Viscosity Index:	103	ASTM D 2270
	Total Sulphur, Mass%	0.6 %	ASTM D 4294
<b>SN 500</b>	Kinematic Viscosity @ 100°C	10.75-11.25 mm <sup>2</sup> /s	ASTM D 445
	Pour Point	-9°C	ASTM D 97
	Viscosity Index	95	ASTM D 2270
	Total Sulphur, Mass%	0.6%	ASTM D 4294
<b>Bright Stock BS 150</b>	Kinematic Viscosity @ 100°C	31.0-34.0 mm <sup>2</sup> /s	ASTM D 445
	Pour Point	-9°C	ASTM D 97
	Viscosity Index	95	ASTM D 2270
	Total Sulphur, Mass%	0.8%	ASTM D 4294





# WAX

Commercial Name	Key Property	Specifications	Test Method
<b>150 SW</b>	ASTM Color	0.5 Max	ASTM D 1500-91
	Oil Content, Mass%	10% Max	ASTM D 721-87(93)
	Congealing Point	51-58°C	ASTM D 938
	Kinematic Viscosity @ 100°C	2.5-5.5 Cst	ASTM D 445-94
<b>500 SW</b>	ASTM Color	0.5 Max	ASTM D 1500-91
	Oil Content, Mass%	13% Max	ASTM D 721-87(93)
	Congealing Point,	60-67°C	ASTM D 938
	Kinematic Viscosity @ 100°C	6.0-9.0 Cst	ASTM D 445-94
<b>BS SW</b>	ASTM Color	0.5 Max	ASTM D 1500-91
	Oil Content, Mass%	10% Mass%	ASTM D 721-87(93)
	Congealing Point	70-77°C	ASTM D 938
	Kinematic Viscosity @ 100°C	15.0-20.0 Cst	ASTM D 445-94





## EXTRACT

Commercial Name	Key Property	Specifications	Test Method
<b>150 Extract</b>	Kinematic Viscosity @ 100°C	5-15 mm <sup>2</sup> /s	ASTM D 445
	Flash Point, COC	180°C, Min	ASTM D 92
	Pour Point	+24°C, Max	ASTM D 97
	Aline Point	50°C, Max	ASTM D 611
	Total Sulphur	6.2 Mass% Max	ASTM D 4294
<b>500 Extract</b>	Kinematic Viscosity @ 100°C	Report	ASTM D 445
	Flash Point, COC	220°C, Min	ASTM D 92
<b>DAE</b>	Pour Point	+30°C, Max	ASTM D 97
<b>Rubber Processing Oil</b>	Aline Point	60°C, Max	ASTM D 611
<b>High Aromatic Extender Oil</b>	Total Sulphur	6.2 Mass% Max	ASTM D 4294
<b>BS Extract</b>	Kinematic Viscosity @ 100°C	60-120 mm <sup>2</sup> /s	ASTM D 445
	Flash Point, COC	250°C, Min	ASTM D 92
<b>RAE</b>	Pour Point	30°C, Max	ASTM D 97
<b>Rubber Processing Oil</b>	Aline Point	70°C, Max	ASTM D 611
	Total Sulphur	6.0 Mass% Max	ASTM D 4294





# BITUMEN

Bitumen (or asphalt) is the heaviest product obtained from the distillation process of crude oil. It is primarily used to produce paving materials for pavements, parking lots, airport runways, for example.

Commercial Name	Key Property	Specifications	Test Method
<b>Bitumen 60/70</b>	Penetration Test @ 25°C	60-70	ASTM D 5
	Softening Point	45-55°C	ASTM D 36
	<b>Residue from Thin-Film Oven Test</b>		
	Dynamic Shear Rheology $G^*/\sin\delta$ at 10 rad/s	1.0 Min kPa @ 64°C	ASSHTO T 315
<b>Bitumen 40/50</b>	Penetration Test @ 25°C	40-50	ASTM D 5
	Softening Point	48-58°C	ASTM D 36
	<b>Thin Film Oven Test</b>		
	Retained Penetration	58 Min	ASTMD1754 / ASTMD5
	Dynamic Shear Rheology $G^*/\sin\delta$ at 10 rad/s	1.0 Min kPa @ 70°C	AASHTO T 315

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# AROMATICS



## PARAXYLENE

Paraxylene is used in intermediate petrochemical plant as a raw material for PTA (Purified Terephthalic Acid). Currently, 65% of PTA is used to produce Polyester Fiber or Synthetic Fiber, which is used as a raw material for apparels such as clothing and fabric bag.

Key Property	Specifications	Test Method
Para-Xylene Purity	99.7 %wt Min	ASTM D 5917
Meta-Xylene	0.30 %wt Max	ASTM D 5917
Total Sulphur	1 mg/kg Max	ASTM D 5453 / D 7183
Total Chloride	10 mg/kg Max	ASTM D 5808



## BENZENE

Benzene is a raw material for intermediate petrochemical plants to make other chemicals including Styrene Monomer , Cumene , and Cyclohexane, which are used in the downstream petrochemical industry.

Key Property	Specifications	Test Method
Benzene Purity	99.8 %wt Min	ASTM D 7504
Toluene	0.10 %wt Max	ASTM D 7504
Non-Aromatics	1.5 %wt Max	ASTM D 7504



## TOLUENE

Toluene has numerous commercial and industrial applications. It can be used as a gasoline blending component to boost Octane value, and is predominantly used as a solvent in paint, thinner, ink, printing, adhesive and insecticide, for example.

Key Property	Specifications	Test Method
<b>Toluene</b>	99.7 %wt Min	UOP 744
<b>Non-Aromatics</b>	1.5 %wt Max	UOP 744
<b>Benzene</b>	100 mg/kg Max	UOP 744 / ASTM D7504



## MIXED XYLENE (ISOMER)

Mixed Xylene is a starting material for petrochemical plants in the manufacture of Paraxylene. It can also be used to boost the octane value in gasoline, as well as a solvent for coating substances, insecticides, paint, and adhesive, etc.

Key Property	Specifications	Test Method
<b>C8 Aromatics Purity</b>	98.0 %wt Min	UOP 744
<b>Non-Aromatics</b>	1 %wt Max	UOP 744
<b>Ethyl Benzene</b>	18 %wt Max	UOP 744

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## LINEAR ALKYL BENZENE (LAB)

LAB (Linear Alkyl Benzene) is the main compound in the production of detergents and cleaning products. It is produced through the alkylation of Benzene and Normal Paraffin, which can be extracted from Kerosene. Most of the LAB produced will be used in the production of LAS (Linear Alkylbenzene Sulfonate), which can then be used to make detergents and cleaning products.

Key Property	Specifications	Test Method
N-Alkylbenzene	92 Min	UOP 673
Molecular weight distribution	237 - 244	UOP 673
Bromine Index	10 Max	UOP 304
Density @ 15°C	0.855-0.870	ASTM D 4052



## HEAVY ALKYL BENZENE (HAB)

Key Property	Specifications	Test Method
Density @ 15°C	0.860-0.890	ASTM D 4052
Kinematic Viscosity @ 40°C	10 Min	ASTM D 445
ASTM Color	5.0 max	ASTM D 1500



## RAFFINATE (WHITE SPIRIT)

Key Property	Specifications	Test Method
Density @ 15.0°C	0.800-0.820	ASTM D 4052
Distillation, IBP	160.0 Min	ASTM D 86
Distillation, FBP	270.0 Max	ASTM D 86
Aromatics	15.0-25.0	ASTM D 1319



## APPLICATIONS OF LABIX PRODUCTS

- Powders detergents
- Liquid detergents
- Dishwashing liquids
- Liquid household cleaners
- Agricultural herbicides
- Emulsion polymerization
- Emulsifier
- Wetting agent

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# SOLVENTS & CHEMICALS



## HYDROCARBON SOLVENTS

TOP Solvent produces a wide range of hydrocarbon solvents, including paraffins, aliphatics, SBPs, mineral spirits, aromatics, and blends. Some of the many everyday items that depend upon hydrocarbon solvents include Petrochemicals, Paints & Coatings, Adhesives & Sealants, Dry cleaning fluids, Insecticides, Edible oils, and Tyres.

### ALIPHATIC

### AROMATIC

### WHITE SPIRIT

Cyclohexane

Cyclopentane

GTL Solvent (Gas to Liquid)

Hexane Extraction

Hexane Polymer

Isopentane

N-Pentane 95

N-Pentane 99

Pentane 60/40

Pentane 80/20

TOPSol 60/145

TOPSol BF

TOPSol D40

TOPSol D80

TOPSol TC

TOPSol X2000

C10 Plus

C9 Plus

Mixed Xylene (Isomer Grade)

Mixed Xylene (Solvent Grade)

Toluene

TOPSol A100

TOPSol A150ND

TOPSol A200

LAWS 3040

TOPSol 2046

WS 200





## CHEMICAL SOLVENTS

TOP Solvent Group is a leading chemical distributor in Asia. We offer various groups of chemical ( oxygenated ) solvents and also specialty chemicals from leading strategic suppliers throughout the world. We are a solution partner for a variety of industries such as Paint & Coating, Thinner, Adhesive & Sealant, Windscreen Cleaner, Ink, Food & Beverage, Household Cleaning Products, Personal Care, and Sanitizer.

### ALCOHOL

### KETONE

### ESTER

### GLYCOL

Denatured Ethanol 95

Iso-Butanol (IBA)

Isopropanol (IPA)

Methanol

N-Butanol (NBA)

N-Propanol (NPA)

Cyclohexanone (CYC)

Diacetone Alcohol (DAA)

Dimethyl Ketone (Acetone)

Isophorone

Methyl Ethyl Ketone (MEK)

Methyl Isobutyl Ketone (MIBK)

Butyl Acetate (BAC)

Butyl Glycol Acetate (EGBEA)

Ethyl Acetate (EAC)

Iso Butyl Acetate (IBAC)

Methyl Acetate (MAC)

N-Propyl Acetate (NPAC)

Sec-Butyl Acetate (SBAC)

TOPSol PMA (PGMEA)

Butyl Diglycol Ether (BDGE)

Butyl Glycol Ether (BGE)

Diethylene Glycol (DEG)

Ethyl Diproxitol (EDP)

Monoethylene Glycol (MEG)

Monopropylene Glycol (MPG)

TOPSol PM (PGME)

Triethylene Glycol (TEG)

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