上海期货交易所 SHANGHAI FUTURES EXCHANGE

上海国际能源交易中心 SHANGHAI INTERNATIONAL ENERGY EXCHANGE

CRUDE OIL FUTURES TRADING HANDBOOK

2022 Edition

Crude Oil Futures Trading Handbook 2022 Edition

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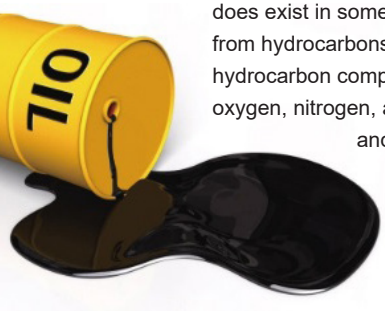
CRUDE OIL: INTRODUCTION

General Properties and Composition

Crude oil is a mixture of liquid hydrocarbons and their other natural forms directly extracted from underground reservoirs. It is usually a flowing or semi-flowing viscous liquid.

Both the properties and appearance of crude oil vary with the region from which it is produced. In terms of color, most crude varieties are black, while some are dark grey, dark green, dark brown, or even reddish brown, light yellow, or colorless; in terms of specific gravity, most varieties fall between 0.8 and 0.98. Crude oil also tends to be smelly due to the sulfur compounds it contains.

Crude oil is mainly composed of carbon, hydrogen, sulfur, nitrogen, oxygen, and trace elements. Carbon and hydrogen are the main constituents, accounting for approximately 96–99% of crude oil by weight, with the rest accounting for no more than 1–4%. All these elements exist in crude oil in the form of organic compounds, most of which are hydrocarbons including alkanes, cycloalkanes, aromatics, and hydrocarbon mixtures having the molecular structures of all three. Crude oil doesn't normally contain alkenes or alkynes, but the former does exist in some products from the second stage of refining. Aside from hydrocarbons, crude oil also has a considerable amount of non-hydrocarbon compounds, mainly including compounds containing sulfur, oxygen, nitrogen, as well as gelatinous and asphaltic substances (resins and asphaltenes), which altogether representing 10–20% of crude oil by mass.



As a complex, multi-component substance, crude oil has a very wide boiling range from room temperature to above 500 °C. While each component has its own characteristics, it is unnecessary to break down crude oil into individual components to derive useful petroleum products. In general, simply separating crude oil by fractional distillation should be enough for research and processing purposes. The term “fractional distillation” means “cutting” crude oil into “fractions” by the different boiling points of its components. Such fractions are often referred to as gasoline, kerosene, diesel, lubricating oil, or some other petroleum products, but they are not petroleum products in the strict sense of the term because the latter must meet certain quality requirements, while the former is just intermediate or semi-finished products that require further processing before becoming true petroleum products.

Main Performance Indicators

The main performance indicators of crude oil and petroleum products include, among others, density, viscosity, solidifying point, asphaltene and resin content, sulfur content, wax content, wax appearance point (cloud point), water content, total acid number (TAN), flash point, specific heat, and explosive limit. For crude oil, the physical properties are key indicators in determining its quality (and that of the resulting products) and controlling the refining process.

Density

The density of crude oil refers to its mass per unit volume. In general, lower density crude oil yields a higher ratio of light oil.

Because rising temperature increases a petroleum product’s volume and thus reduces its density, density is only meaningful alongside a temperature. China’s national standard (GB/T 1884) prescribes that the density at 20 °C, represented by ρ_{20}, is to be the standard density of petroleum and liquid petroleum products in China.

The specific gravity of a petroleum product refers to the ratio of its density to the density of water at a specified temperature, and is generally denoted as d_4^t for petroleum product at t °C. In China and Eastern Europe, the commonly used specific gravity is $d_{4°C}^{20°C}$, whereas in America and other European countries it's $d_{60°F}^{60°F}$ i.e., the ratio of the density of petroleum product at 60 °F to that of water at 60 °F (approx. 15.6 °C).

Countries in this latter group often use a specific gravity index known as "API gravity at 60 °F" ("API gravity" for short) to indicate the standard density of petroleum products. API gravity is the opposite of density, in that a larger API gravity means a lower density. At present, API gravity is one of the primary factors in the global pricing of crude oil. Higher API gravity means a lighter crude oil and commands a higher price.

$$\text{API gravity} = (141.5 / d_{60°F}^{60°F}) - 131.5,$$

where degrees Fahrenheit (°F) = 32 + degrees Celsius (°C) × 1.8

Viscosity

The viscosity of crude oil can be expressed and measured in a number of ways which often vary across countries. China uses kinematic viscosity and the Engler scale; countries including the U.S. and Great Britain use the Saybolt and Redwood scales; most countries in Western Europe, including Germany, adopt the same standards as China. The International Standardization Organization (ISO) has named kinematic viscosity to be the universal standard, a brief overview for which is given below.

The kinematic viscosity of crude oil refers to the ratio of its dynamic viscosity to its density.

Dynamic viscosity is measured in pascal second (Pa * s) in the SI system and poise (P) or centipoise (cP) in the CGS system, interconvertible as follows:

$$1 \text{ Pa} * \text{s} = 10 \text{ P} = 10^3 \text{ cP}$$

Kinematic viscosity, therefore, has a unit of m^2/s or mm^2/s in SI and stokes (St) or centistokes (cSt, or 1/100 St) in CGS. For example, “180 cSt fuel oil” means fuel oil with a kinematic viscosity of 180 cSt. The two systems of units are interconvertible as follows:

$$1\ m^2/s = 10^6\ mm^2/s = 10^6\ cSt$$

Viscosity measures the resistance of crude oil to flow, and will decrease with rising temperature. Viscous, high pour-point crude oil and gas oil should be heated during shipment to maintain fluidity.

Low Temperature Performance

A petroleum product’s low temperature performance is a vital quality indicator that directly affects how the product should be shipped, stored, and used. This performance is measured by a number of metrics, including cloud point, crystallization point, freezing point, solidifying point, pour point, and cold filter plugging point, with solidifying point and pour point being the most important.

Solidifying point refers to the highest temperature that a petroleum product under prescribed thermal and shearing conditions can maintain a flowing surface when cooled. Pour point refers to the lowest temperature that a petroleum product can maintain its fluidity under prescribed laboratory conditions. The solidifying point of crude oil ranges from -50 °C to 35 °C depending on its composition. In particular, crude oil with a high proportion of light components has a lower solidifying point; conversely, crude oil with a high proportion of heavy components (especially paraffin) has a higher solidifying point.

Combustion Performance

Most petroleum products are flammable and explosive. Indicators like flash point, fire point, and auto-ignition temperature define the level of fire hazard – with lower values indicate a more easily combustible product – and are essential for ensuring personal and property safety during the storage and shipment of crude oil and petroleum products.

Sulfur Content

Nearly all crude oil and petroleum products contain some concentration of sulfur. Sulfur compounds negatively affect the refining process and the application of petroleum products; for instance, they corrode metallic equipment and pipelines, cause catalyst poisoning, and lower product quality. This is becoming a more prominent problem in recent years: as China's economic boom has catapulted car ownership to record levels, SO_2, SO_3, and other pollutants from the combustion of sulfur-containing fuel can cause serious harm to the environment. Hence, it is essential to limit the sulfur content in petroleum products; in particular, crude oil should undergo desulfurization before further processing.

Solubility

Crude oil is insoluble in water but can be combined with it to form an emulsion; crude oil is soluble in organic solvents like benzene, essence, ether, chloroform and carbon tetrachloride, and partially soluble in alcohol.

Crude Oil Classification

Crude oil can generally be classified by industrial, chemical, physical, or geological standards, with industrial (commodity) and chemical standards being the most common choice.

Industrial (Commodity) Standard

This standard encompasses a wide range of classification schemes, including by density, sulfur content, nitrogen content, wax content, and resin content. Internationally, crude oil is commonly priced based on its classification as defined by its API gravity and sulfur content.

Crude Oil Classification by API Gravity		
Classification	API Gravity	Density at 15 °C (g/cm^3)
Light	> 34.9	≤ 850
Medium	> 29.2	≤ 880
Heavy	> 20.6	≤ 930
Extra-Heavy	≤ 20.6	> 930

Source: *Storage and Shipment of Petroleum Materials*, China University of Petroleum Press

According to the internationally accepted classification standards, the API of ultralight crude oil is API≥50, the API of light crude oil is 35≤API < 50, the API of medium crude oil is 26≤API < 35, and the API of heavy crude oil is 10≤API < 26. In practice, these numerical ranges are not strictly observed and may vary from country to country and from company to company, as other factors such as marker crude would also often play a role.

In China, Daqing, Shengli, Liaohe, and Dagang oilfields produce medium crude oil; oilfields at Gudao and Urho district yield heavy crude oil; and Shuguang Zone 1 of the Liaohe oilfields and certain oil wells at Gudao produce extra-heavy crude oil.

Crude Oil Classification by Other Industrial Parameters						
Parameter	Sulfur Content			Nitrogen Content		
Category	Low	Medium	High	Low	Medium	High
% by Mass	< 0.5	0.5–2	> 2	< 0.25	–	> 0.25
Parameter	Wax Content			Resin Content		
Category	Low	Medium	High	Low	Medium	High
% by Mass	0.5–2.5	2.5–10	> 10	< 5	5–15	> 15

Source: *Storage and Shipment of Petroleum Materials*, China University of Petroleum Press

Chemical Standard

Chemical classification schemes are based on the chemical composition of crude oil, often focusing on some of the physical properties of crude oil that are directly related to its chemical composition.

1.By characterization factor

The characterization factor, or the K factor, is a function of the specific gravity and boiling point of crude oil and remains fairly constant for crude oils of similar chemical compositions. This property makes it suitable as a classification parameter.

Crude Oil Classification by Characterization Factor			
Characterization Factor	Naphthenic	Intermediate	Paraffinic
K Factor	≤ 11.5	≤ 12.1	> 12.1

Source: *Requirements on Import Crude Oil Quality Evaluation* (SN/T 2999-2011)
Source: *Storage and Shipment of Petroleum Materials*, China University of Petroleum Press

2.By key fraction properties

This kind of classification is based on the specific gravities of two key fractions of crude oil. The two key fractions are obtained at 250–275°C and 395–425°C, respectively, from crude oil kept in a special apparatus and distilled under specified conditions.

Crude Oil Classification by Key Fractions		
Key Fraction	First Key Fraction	Second Key Fraction
Paraffinic	ρ_{20} < 0.8210 g/cm^3 API gravity > 40	ρ_{20} < 0.8723 g/cm^3 API gravity > 30
Intermediate	ρ_{20} = 0.8210–0.8562 g/cm^3 API gravity = 33–40	ρ_{20} = 0.8723–0.9305 g/cm^3 API gravity = 20–30
Naphthenic	ρ_{20} > 0.8562 g/cm^3 API gravity < 33	ρ_{20} > 0.9305 g/cm^3 API gravity < 20

Source: *Storage and Shipment of Petroleum Materials*, China University of Petroleum Press

Crude Oil Refining

Crude oil refining is generally divided into primary refining and secondary refining.

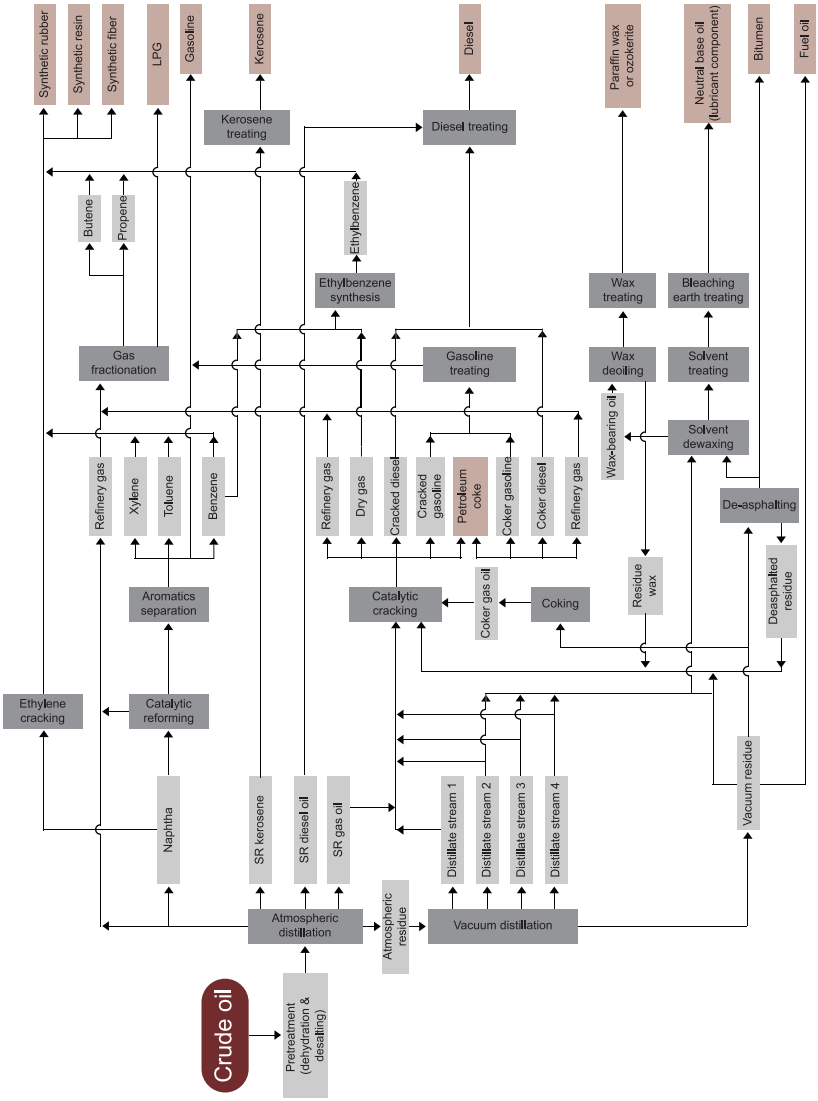
Primary refining is a process during which crude oil is separated by distillation into fractions of various weights, taking advantage of the fact that different crude oil components have different boiling points. This process, commonly referred to as distillation, includes such stages as pretreatment, atmospheric distillation, and vacuum distillation. The products of primary refining include (1) light distillates, referring to distillates with a boiling point below about 370 °C, such as gasoline, kerosene, and diesel; (2) heavy distillates, referring to distillates with a boiling point between about 370 °C and 540 °C, such as gas oil, various lubricating oils, and cracking feedstock; and (3) residues (atmospheric residue, vacuum residue).

Secondary refining refers to further processing of products from primary refining. During this process, heavy distillates and residues are cracked by various means, including catalytic cracking, hydrocracking, and coking, to produce light oils. Catalytic reforming and petroleum product refining are also part of secondary refining.

Petroleum Products and Main Applications

Petroleum products are the general name of all kinds of commodities directly produced by petroleum or some part of petroleum as raw materials, generally excluding petrochemical products synthesized from petroleum as raw materials, which are mainly divided into six categories: fuels, lubricants, bitumen, paraffin wax, petroleum coke, solvents, and industrial chemicals.

Products in the “fuels” category include engine fuels such as gasoline, diesel and jet fuel (aviation kerosene), as well as kerosene and fuel oils. In China, about 80% of the petroleum products are petroleum fuels, of which 60% are various types of engine fuels. Lubricants are the best represented in terms of variety (over 100), but only account for 5% of the total production. Solvents and industrial chemicals, including cracking feedstock used for producing ethylene, petroleum aromatic hydrocarbons, and various solvent oils, account for around 10% of the total production, while bitumen, paraffin wax, and petroleum coke account for the remaining 5%–6%.


Crude oil
Pretreatment (dehydration & desalting)
Atmospheric distillation
Vacuum distillation
Atmospheric residue
Naphtha
SR kerosene
SR diesel oil
SR gas oil
Distillate stream 1
Distillate stream 2
Distillate stream 3
Distillate stream 4
Vacuum residue
Ethylene cracking
Catalytic reforming
Aromatics separation
Refinery gas
Xylene
Toluene
Benzene
Catalytic cracking
Coking
Coker gas oil
Refinery gas
Dry gas
Cracked diesel
Cracked gasoline
Petroleum coke
Coker gasoline
Coker diesel
Refinery gas
Residue wax
Wax-bearing oil
Deasphalted residue
De-asphalting
Gas fractionation
Butene
Propene
Kerosene treating
Ethylbenzene synthesis
Ethylbenzene
Gasoline treating
Diesel treating
Wax deoiling
Solvent dewaxing
Wax treating
Solvent treating
Bleaching earth treating
Synthetic rubber
Synthetic resin
Synthetic fiber
LPG
Gasoline
Kerosene
Diesel
Paraffin wax or ozokerite
Neutral base oil (lubricant component)
Bitumen
Fuel oil

OVERVIEW OF THE DOMESTIC AND INTERNATIONAL OIL MARKETS

The oil industry has been around for more than 150 years, but true free trade in the international oil market did not begin until the late 1960s.

In the first 70 years of the 20th century, the price of oil remained fairly stable in spite of major global conflicts. This is in part due to the control of Western multinational oil companies over the vast majority of oil resources in the Middle East, and the oil prices by extension, through “concession agreements.” The establishment of the Organization of Petroleum Exporting Countries (OPEC) in 1960 marked the gradual shift of Western control of oil prices to OPEC. In the 1970s, the control of OPEC over most of the world’s oil supply was powerfully demonstrated in the two oil crises involving Saudi Arabia and Iran, when oil prices were pushed to record levels. Starting from the 1980s, however, non-OPEC countries gradually overtook OPEC countries in oil production, causing a global oversupply and the oil prices to plummet in a “reverse oil crisis.” This new market landscape signaled that the world’s oil prices would no longer be dictated by any single organization, but rather by a multitude of factors influenced by market forces.

The growing volatility in international oil prices in recent years has prompted a strong need for risk mitigation tools. The international crude oil futures market germinated to fill that void, and has been developing rapidly since the 1990s.

The International Oil Market

Global Distribution of Oil Reserves

The global distribution of oil reserves is extremely uneven: more in the Eastern Hemisphere than in the Western Hemisphere, at a ratio of 3:1; more in the Northern Hemisphere than in the Southern Hemisphere; and mostly between two latitude bands: between 20° N and 40° N, where 51.3% of the world's oil reserves—represented by the two major production areas of the Persian Gulf and the Gulf of Mexico, plus North Africa—are located, and between 50° N and 70° N, home to many well-known oilfields in the North Sea, Siberia in Russia, and the Volga-Ural region.

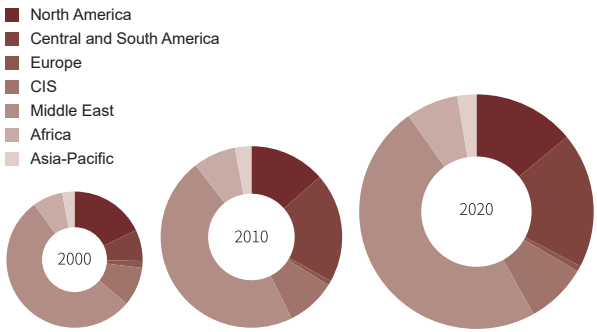
With the advent of new exploration technologies and the rising demand for oil, worldwide proven oil reserves have been increasing year by year.

Time-wise, BP's Statistical Review of World Energy 2021 reports an increase of 5.49% over the decade between 2010 and 2020, from 1.64 trillion barrels to 1.73 trillion barrels.

Region-wise, the distribution of proven oil reserves is wildly uneven, with 0.84 trillion barrels in the Middle East, accounting for 48.3% of the world's total; 0.01 trillion barrels in Europe and Eurasia (0.8%); 0.32 trillion barrels in Central and South America (18.7%); 0.13 trillion barrels in Africa (7.2%); 0.24 trillion barrels in North America (14.0%); and merely 0.05 trillion barrels in Asia-Pacific (2.6%). The proven reserves have been growing the fastest in Central and South America at an average annual rate of 3.3% in the past ten years.

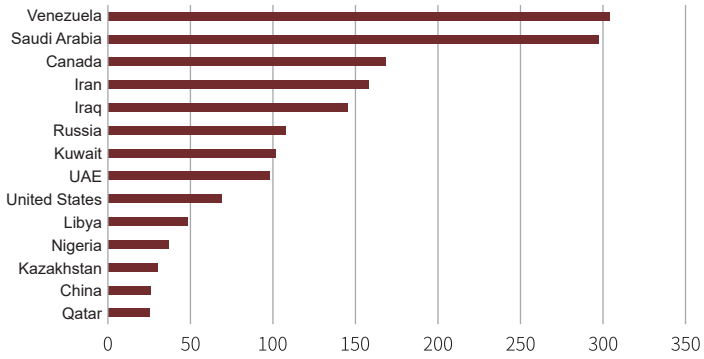
Nation-wise, by the end of 2020, Venezuela boasted the world's largest proven reserves of 303.8 billion barrels, or 17.5% of the global total, thanks to the Orinoco Belt, the largest deposit of extra heavy crudes in the world. Next are Saudi Arabia and Canada, at 17.2% and 9.7% respectively. Notably, the oil sands in northern Alberta, Canada, while an unconventional source of crude oil, represent more than 95.7% of Canada's total reserves. Rounding up the top five are Iran and Iraq. In 2020, China's proven reserves were 26 billion barrels, or 1.5% of the global total. Recent years have seen a shifting global energy supply landscape with the development of new extraction technologies for unconventional oil and gas resources, most prominently represented by the shale and tight resources in the United States.

Proven Oil Reserves in 2000, 2010, and 2020 by Region (bn bbl)



Source: BP's Statistical Review of World Energy 2021

Proven Oil Reserves at End of 2020 by Country (bn bbl)



Source: BP's Statistical Review of World Energy 2021

Global Oil Production and Consumption

Production and Geographical Distribution

Worldwide oil production and consumption have been on the rise. According to BP's Statistical Review of World Energy 2021, global production in 2020 was 88.39 million barrels/day (b/d), down 6.9% from 94.96 million b/d in 2019; up

6.12% from 83.29 million b/d in 2010; and up 18.58% from 74.54 million b/d in 2000. Within the 20 years from 2000 to 2020, the world's oil production grew 0.93% annually on average.

Region-wise, production is centered around the Middle East, North America, as well as Europe and the Commonwealth of Independent States (CIS) countries. In 2020 these regions respectively produced 27.66 million, 23.52 million, and 17.08 million b/d, representing 31.3%, 26.6% and 19.3% of the world's total.

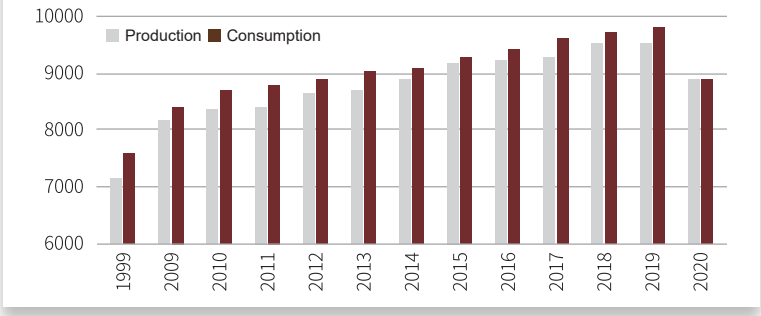
In 2020, the combined output of the United States, Saudi Arabia, Russia, Iran, Iraq, Canada, and the United Arab Emirates reached 54.17 million b/d, or 61.3% of the world's total.

Consumption

Global consumption in 2020 was 88.58 million b/d, down 9.3% from the previous year, the largest decline in the past two decades. This unprecedented fall is mainly due to the pandemic, in response to which countries have locked down cities to varying degrees, resulting in a sharp reduction in transport-related energy demand. China was the only country among the major oil consumers that recorded a growth of 1.6% in consumption, thanks to its success at containing Covid-19.

The top five consumers in 2020 were the United States, China, India, Japan, and Saudi Arabia, totaling 46.32 million b/d or 47.1% of the worldwide consumption. The United States took the top spot at 17.18 million b/d in 2019, or 19.4% of the global total. China recorded the fastest consumption growth, from 9.39 million b/d in 2010 to 14.23 million b/d in 2020, an average annual increase of 5.15%, making it the world's second-largest oil consumer at present.

Global Oil Production and Consumption (10,000 bbl/day)



Source: BP's Statistical Review of World Energy 2021

Major Exchanges for Crude Oil Futures

About a dozen exchanges worldwide list crude oil futures today. The two most influential are NYMEX, part of the CME Group, and the Intercontinental Exchange (ICE). The NYMEX WTI Crude Oil futures and ICE Brent Crude futures, accordingly, are the respective benchmark in the United States and Europe. Another important benchmark is Dubai Mercantile Exchange's Oman crude oil futures. INE's Shanghai crude oil futures contract, listed a mere four years ago, has become the third-most-traded crude oil futures contract in the world.

According to the latest data of the Futures Industry Association (FIA), the most-traded crude oil futures contracts in 2021 were MOEX Brent Crude Oil futures, NYMEX WTI Crude Oil futures, ICE Brent Crude futures, ICE WTI Crude futures, and INE's crude oil futures.

Trading Volume of Major International Crude Oil Futures Contracts in 2021

	Exchange	Contract	Trading Volume (lot)
1	Moscow Exchange	Brent Oil Futures	579,590,791
2	New York Mercantile Exchange	WTI Sweet Crude Oil (CL) Futures	248,314,481
3	ICE Futures Europe	Brent Crude Oil Futures	243,666,353
4	ICE Futures Europe	WTI Light Sweet Crude Oil Futures	51,721,597
5	Shanghai International Energy Exchange	Medium Sour Crude Oil Futures	42,645,180
6	New York Mercantile Exchange	Crude Oil (LO) Options	30,006,061
7	ICE Futures Europe	Brent Crude Oil Options	29,017,774
8	New York Mercantile Exchange	Brent Crude Oil Last Day Financial (BZ) Futures	24,184,136
9	Multi Commodity Exchange of India	Crude Oil Futures	19,083,426
10	Multi Commodity Exchange of India	Crude Oil Options	15,798,979

Source: FIA

Note: MOEX Brent Crude Oil futures is 10 bbl/lot; MCX's crude oil futures is 100 bbl/lot.

Comparison of Major Global Crude Oil Contracts					
	INE (SC)	ICE Brent (B)	CME WTI (CL)	DME Oman (OQD)	ICE Futures Abu Dhabi Murban (ADM)
Underlying Product	Medium sour crude oil with API gravity of 32 and sulfur content of 1.5% by weight. Deliverable grades and premiums / discounts will be separately set by INE	BFOET (Brent, Forties, Oseberg, Ekofisk, Troll)	WTI / DSW [1]	Oman crude oil	Murban crude oil
Contract Size	1,000 barrels	1,000 barrels	1,000 barrels	1,000 barrels	1,000 barrels
Price Quotation	Yuan per barrel	U.S. Dollar and Cents per barrel	U.S. Dollar and Cents per barrel	U.S. Dollar and Cents per barrel	U.S. Dollar and Cents per barrel
Minimum Price Fluctuation	¥0.1 per barrel	$0.01 per barrel	$0.01 per barrel	$0.01 per barrel	$0.01 per barrel
Settlement Method	Physical delivery	Cash settlement	Physical delivery	Physical delivery	Physical delivery
Delivery Method / Type	Delivery at INE-designated delivery storage facilities in bonded zones	EFP	FOB at pipeline or delivery at depot	FOB at the loading port	FOB at the loading port
Settlement Price	The daily volume-weighted average price (VWAP)	VWAP from 19:28 to 19:30 London time	VWAP from 14:28 to 14:30 Eastern time (US)	Released daily at 13:30 CST/CDT at the same time as that of the NYMEX light sweet crude oil futures	VWAP from 19:28 to 19:30 London time

[1] WTI/DSW shall meet the grade and quality specifications on sulfur, API, viscosity, RVP, basic sediment, pour point, micro method carbon residue, TAN, total acid number, nickel, vanadium and HTSD

	INE (SC)	ICE Brent (B)	CME WTI (CL)	DME Oman (OQD)	ICE Futures Abu Dhabi Murban (ADM)
Last Trading Day	The last trading day of the month preceding the contract month	The last business day of the second month preceding the contract month	3 business day prior to the 25th calendar day of the month prior to the contract month. If the 25th calendar day is not a business day, trading terminates 4 business days prior to the 25th calendar day of the month prior to the contract month	The last trading day of the second month preceding the delivery month	Trading ceases at 16:30 Singapore time on the last trading day of the second month preceding the delivery month. If that day is the trading day preceding New Year's Day, then trading ceases on the next preceding trading day
Delivery Period	Five consecutive business days after the last trading day [2]	Generally cash-settled through EFP before expiry	From the first calendar day to the last calendar day of the delivery month	Delivery matching and tanker selection in the month preceding the contract month; delivery in contract month	The first Terminal Loading Day of the delivery month to the third Terminal Loading Day prior to the end of the said delivery month
Price Limits	Within ±4% from the settlement price of the previous day	Interval price limits (IPL) functionality acts as a temporary circuit breaker feature on the electronic platform, to diminish the likelihood and extent of short-term price spikes or aberrant market moves. While designed to be in force throughout each trading day, it is expected the protections will be triggered only in the case of extreme price moves over very short periods of time	A circuit breaker that triggers a 2-minute trading halt upon touching a specific price range. Price limit is removed after the fourth triggering on a trading day	None	Interval price limits (IPL) functionality acts as a temporary circuit breaker feature on the electronic platform, to diminish the likelihood and extent of short-term price spikes or aberrant market moves. While designed to be in force throughout each trading day, it is expected the protections will be triggered only in the case of extreme price moves over very short periods of time

[2] Because China's crude oil futures are delivered through standard warrants, "five consecutive business days after the last trading day" refers to the period for the transfer of warrants, while the actual loading of goods (either onto a vessel or into a storage facility) would have been completed before then.

	INE (SC)	ICE Brent (B)	CME WTI (CL)	DME Oman (OQD)	ICE Futures Abu Dhabi Murban (ADM)
Minimum Trading Margin	5% of contract value	Initial margin: $4,000–$12,000/lot, progressively lower for the longer-dated contracts [3]	Initial margin: $4,000–$12,000/lot, progressively lower for the longer-dated contracts [4]	Maintenance margin: $11,800–$9,000/lot, progressively lower for the longer-dated contracts [5]	Initial margin: $3,259.1–$8,890/lot [6]
Contract Months	Monthly contracts of recent 12 consecutive months followed by 8 quarterly contracts	96 consecutive months	Monthly contracts listed for the current year and the next 8 calendar years and 2 additional contract months. List monthly contracts for a new calendar year and 2 additional contract months following the termination of trading in the December contract of the current year	Consecutive months are listed for the current year and the next 5 years. A new calendar year will be added following the termination of trading in the December contract of the current year	48 consecutive months
Trading Hours	9:00–11:30, 13:30–15:00 Beijing Time and other hours specified by INE. Continuous trading hours are 21:00– 2:30 (+1 day)	New York Time: 20:00–18:00 (+1 day) London Time: 00:00–22:00 Singapore Time: 08:00–06:00 (+1 day) Sunday Open London: 22:00	CME Globex: 18:00–17:00 New York Time (Eastern Time) Sunday to Friday with a 60-minute break each day beginning at 17:00	Electronic trading is open from 16:00 CST/CDT Sundays and from 16:45 CST/CDT Monday to Thursday and closes at 16:00 CST/CDT the next day, Monday to Friday	New York Time: 20:00–18:00 (+1 day) London Time: 00:00–22:00 Singapore Time: 08:00–06:00 (+1 day) Sunday Open London: 22:00

Source: INE, CME, ICE, DME. As of March 2022

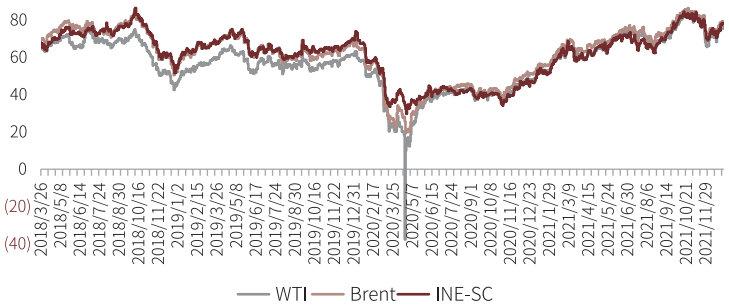
[3] Margin data as of March 21, 2022. Subject to change by the exchange. See https://www.theice.com/products/219/Brent-Crude-Futures/margin-rates for details.
[4] Margin data as of March 21, 2022. Subject to change by the exchange. See https://www.cmegroup.com/markets/energy/crude-oil/light-sweet-crude.margins.html for details.
[5] Margin data as of March 21, 2022. Subject to change by the exchange. See https://www.cmegroup.com/clearing/margins/outright-vol-scans.html#pageNumber=1&sortField=exchange&sortAsc=true for details.
[6] Margin data as of March 21, 2022. Subject to change by the exchange. See https://www.theice.com/products/75443578/Murban-Crude-Oil-Futures/margin-rates for details.

International Crude Oil Price

Global crude oil price showed a generally upward trend in 2021, making major gains in the first 10 months and plateauing from November to December after a brief correction. Several factors contributed to this trend. First, recovering global economy and demand supported the price increase. Second, the oil price was further boosted by the less-than-expected growth in supply. Third, low inventory buoyed the price. Fourth, the resurgence of COVID-19 in the fourth quarter contributed to the correction. Overall, the recovery of oil demand was inextricably linked to that of the global economy and the pandemic remained a major influencing factor.

As of December 31, 2021, INE SC futures closed at ¥499.0/bbl, ICE Brent futures $77.78/bbl, CME WTI futures $75.21/bbl, and DME Oman futures $76.69/bbl, up 65.4%, 50.15%, 55.01%, and 50.20% respectively from the end of 2020. The Brent-WTI spread was $2.57/bbl, down $0.71/bbl from the end of 2020.

International Crude Oil Price Trend (USD/barrel)



Overview of China's Crude Oil Market

Distribution of Oil Reserves

China's oil resources are concentrated in the Bohai Bay, Songliao, Tarim, Ordos, Junggar, Pearl River Mouth, Qaidam, and East China Sea Shelf basins. Together they boast 17.2 billion metric tons of recoverable reserves, or 81.13% of the country's total.

In terms of depth distribution, 80% of China's recoverable reserves are located in the shallow (< 2000 m) and medium-deep (2000–3500 m) range, with a comparatively small proportion situated at the deep (3500–4500 m) and ultra-deep (> 4500 m) range. In terms of geographical distribution, 76% are found in plains, shallow seas, Gobi and other deserts. In terms of quality, 63% are light oil, 28% are tight oil, and 9% are heavy oil.

In China, CNPC (China National Petroleum Corporation), Sinopec (China Petrochemical Corporation) and CNOOC (China National Offshore Oil Corporation) operate a number of large domestic oil and gas fields. In particular, CNPC owns the Daqing, Changqing, Yanchang, Xinjiang, Liaohe, Jilin, Tarim oil fields; Sinopec owns the Shengli, Zhongyuan, and Jianghan oil elds; and CNOOC owns the Bohai oil elds, among others.

Production and Consumption

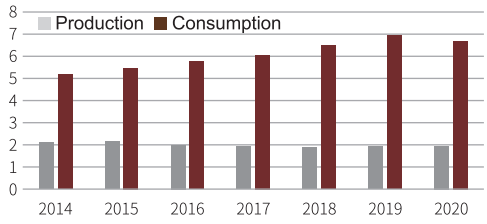
China's crude oil production is heavily concentrated in the northern regions (northeast, northwest, and north China), Shandong, and the Bohai Bay.

Consumption spreads across the whole country, but centers around the Bohai Bay, Yangtze River Delta, and Pearl River Delta.

China's biggest oil consumer is its industrial sector, followed by transportation, agricultural, commercial, and residential sectors. Industrial oil consumption has continuously accounted for at least 50% of total consumption; transportation comes in second, accounting for about 25%.

According to BP Statistical Review of World Energy 2021, from 2014 to 2020 China's crude oil production rose from 185 million to 195 million metric tons, achieving an average annual growth of 0.7%, and making China the world's eighth largest oil producer. China is now also the world's second-largest oil consumer, with its consumption level increasing at an average annual rate of 7.14% over the same period, from 446 million to 669 million metric tons per annum.

Oil Production and Consumption in China(100 million metric tons)



Source: BP Statistical Review of World Energy 2021

Imports and Exports

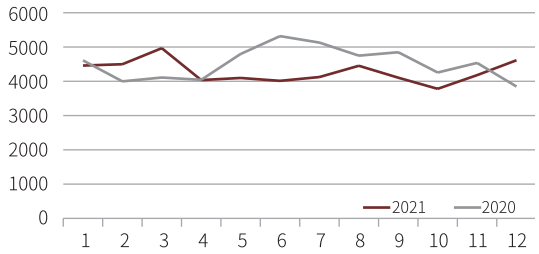
China became a net importer of petroleum products in 1993, and a net importer of crude oil in 1996. Since then, surging domestic demand has steadily driven up the country's crude oil imports.

According to China Customs, from 2015 to 2021, China's crude oil imports rose from 335 million tons to 513 million tons, despite down 5.38% year-on-year most recently. At present, China is the world 's largest importer of crude oil.

In 2021, the top 10 crude oil exporters to China were: Saudi Arabia, Russia, Iraq, Oman, Angola, UAE, Brazil, Kuwait, Malaysia, and Norway. The Middle East as a whole remained the largest exporter to China, accounting for 48.6% of the country's total imports.

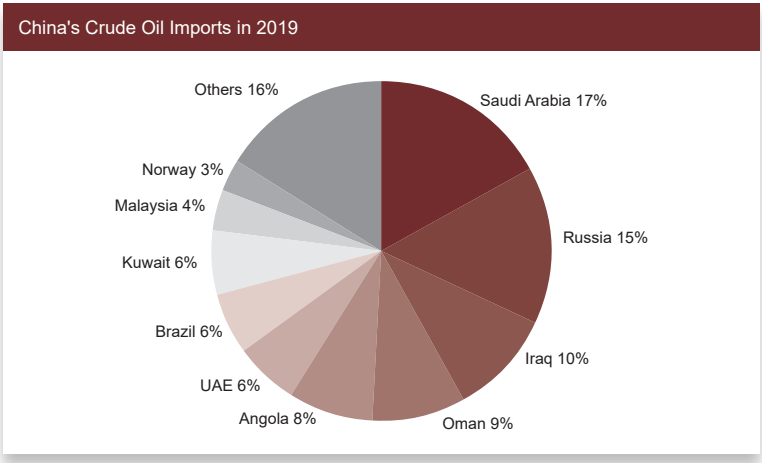
Prior to the 1990s, crude oil was an important source of China's export income. With the rise in domestic demand, however, crude oil exports have been declining since the mid-1990s. At present, a small amount of crude oil exports remained, mostly owing to long-term trade agreements. According to the BP Statistical Review of World Energy 2020, China exported 400,000 metric tons of crude oil in 2019, a year-on-year decrease of 83.3%.

China's Monthly Crude Oil Imports 2020-2021 (10,000 metric tons)



Source: General Administration of Customs

China's Crude Oil Imports in 2019



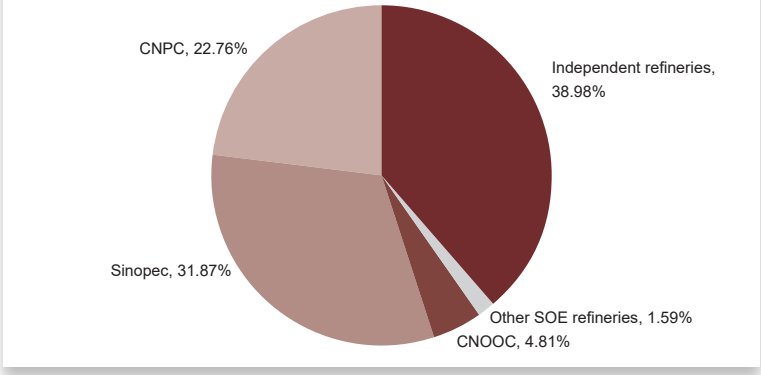
Source: General Administration of Customs

Oil refining in China

China's oil refining capacity

OilChem reports that 186 refineries operated in China as of the end of 2021. Their combined primary oil refining capacity was 944 million metric tons (mt) per year, a 0.12% increase year-on-year and already comparable with that of the United States. In 2021, the combined primary oil refining capacity of China's big three oil companies was 561 million mt a year. Accounting also for the other state-owned or state-backed refineries would bring this figure to 576 million mt a year, or 61.02% of China's total refining capacity. The combined primary oil refining capacity of independent refineries in China was 368 million mt per year, or 326 million mt per year if small refineries (those with no more than 2 million mt/year capacity from atmospheric and vacuum distillation) were excluded.

Primary Oil Refining Capcity in China in 2021 (mn mt/year)



Source: OilChem

Major refineries in China

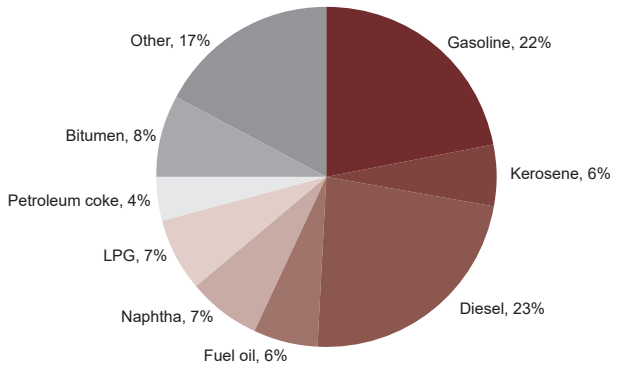
By the end of 2021, the combined primary oil refining capacity of China's major refineries with an annual capacity of over 10 million mt reached 373 million mt per year, representing 39.51% of the national total; that of China's independent refineries with an annual capacity of over 5 million mt hit 220 million mt/year, 23.31% of China's total.

China's Top Ten Refineries with a Primary Oil Refining Capacity of Over 10 Million MT per Year (million mt/year)

No.	Refinery	Parent company	Primary oil refining capacity	Region	Proportion
1	Zhejiang Petroleum & Chemical	Independent	40.00	Zhejiang	4.24%
2	Sinopec Zhenhai Refining & Chemical	Sinopec	23.00	Zhejiang	2.44%
3	Huizhou Refinery	CNOOC	22.00	Guangdong	2.33%
4	Dalian Petrochemical	CNPC	20.50	Liaoning	2.17%
5	Sinopec Maoming Petrochemical	Sinopec	20.00	Guangdong	2.12%
6	Hengli Petrochemical	Independent	20.00	Liaoning	2.12%
7	Sinopec Jinling Petrochemical	Sinopec	18.00	Jiangsu	1.91%
8	Sinopec Shanghai Petrochemical	Sinopec	16.00	Shanghai	1.69%
9	Dushanzi Petrochemical	CNPC	16.00	Xinjiang	1.69%
10	Sinopec Guangzhou Petrochemical	Sinopec	15.70	Guangdong	1.66%

Source: OilChem

China's Oil Refinery Output by Product in 2021



Source: Sublime China Information (SCI)

COMPONENTS AND INFLUENCERS OF CRUDE OIL FUTURES PRICE

Components of Crude Oil Futures Price

Like many other commodity futures products, the price of crude oil futures has two main components: (1) costs, profits, and taxes related to the production process; and (2) costs, circulation expenses, and expected profits from futures trading. These can be further classified into five sub-components for ease of understanding:

1.Production Costs

As is the case with other commodities, the production of crude oil incurs costs such as equipment expenses, wages and salaries, and local taxes. These expenditures form the “foundation” of the oil price. However, it is important to note the two distinctive features in how the production of oil, or more precisely the production costs of crude oil, relates to the price of crude oil futures. First, in international markets, the price of crude oil futures is only weakly influenced by the production costs. This is due to the uneven global distribution of oil resources and a strong baseline demand, which give rise to what is known in economics as a high “differential rent,” meaning the international oil price is generally aligned with the price of higher-cost crudes or alternative energy sources. In fact, crude oil’s production costs, which vary wildly depending on the deposit characteristics, oil qualities, and extraction techniques, are far less than its selling price.

Second, the exploration, exploitation, and other pre-production costs are linked to the market price only in the sense that they are a factor in the decision-making process that determines the output level of the oilfield, and therefore the market supply. Early stage investment warrants careful consideration because it is a major part of the production cost of crude oil, which can be broadly categorized into geological survey costs, construction costs for drilling equipment and ground facilities, and extraction expenses. In practice, early stage expenses are often more important than extraction expenses in the production cost equation.

2.Product Profits

A business has many operating objectives – economic, social, etc. The economic objective is what makes it an enterprise and at the center of that is profit. The price of crude oil futures includes profit from the production process, and because the formation of crude oil requires specific geological conditions, which results in extremely uneven distribution of oil resources around the world, this profit is much higher than in conventional industries, and more characteristic of those of monopolistic industries. According to economic principles, in a monopoly, the price of a product is no longer directly determined by or correlated to the cost of production or the intrinsic value of the product, but rather by the demand and purchasing power of the buyers. While the crude oil market is not fully monopolistic, the bulk of crude resources and output have long been under the control of a supplier group consisting of transnational oil companies, OPEC countries, and non-OPEC oil-producing countries, who have an interest to keep the oil prices at a high but not unbearable level to reap the maximum profit. This dynamic explains why, despite the vast differences in the production cost of crude oil around the world, almost all oilfields are put into operation: simply stated, a higher production cost only causes a minor dent to the bottom line, but nothing to make the whole enterprise unprofitable. This expected profit level is also reflected in the price of crude oil futures.

3.Trading Expenses

Futures trading expenses are those costs incurred or instigated during futures trading, such as commissions and transaction fees, that are payable by the traders. To trade crude oil futures, the trading parties need to have not only the appropriate personnel and equipment, but also a portion of their trading funds tied up as margin. This margin normally equals to about 5%-10% of the notional value of the contract. It is a form of “investment” required for trading on a futures exchange, but not a component of the futures price. The cost of such idle funds and service charges is ultimately reflected in the futures price and, together with the other trading costs, constitute an appreciable portion of the price of crude oil futures.

4.Expected Profits from Trading

Expected profit from futures trading includes both the average return that would be expected on the trading funds if they were invested elsewhere and the risk premium for assuming the trading risks. Accordingly, traders of crude oil futures can be classified as hedgers and speculators. While hedgers enter the market to primarily control their trading risks, without any excessive expectation for profit, speculators do so for the sole purpose of making a profit from price fluctuations. Because speculators are essential to market activity and the wellbeing of futures contracts, the price of crude oil futures also reflects their reasonable profit expectations.

5.Circulation Expenses

Circulation expenses include transportation and incidental expenses, packaging fees, and safekeeping fees for the underlying commodities. Given that futures trading is based on the deliverability of the underlying commodities at a future time, most futures contracts specify a delivery venue. For example, the delivery venue of NYMEX light sweet crude oil futures is Cushing, Oklahoma, USA. Because most of the crude oil being traded is not be produced at the point of delivery, its producers must either ship it to the designated location or provide a distance-based compensation to the buyers. These expenses are also an important part of the price of crude oil futures.

Influencers of Crude Oil Futures Price

Because the futures market is built on the spot market, its further development is inextricably linked to the latter. They react very similarly to market updates, such that prices in these two markets shadow each other's movements both in direction and in magnitude of fluctuation. This kind of interactivity and sustained balance also apply to the futures and spot prices of crude oil.

International oil prices are determined by both the futures market and the spot market. Therefore, factors that influence the spot price, such as imbalance between the supply and demand, may also impact the futures price. In some cases, however, the two prices may diverge due to certain special factors that influence only the futures price, such as speculation by investment funds and other financial factors.

In addition, like other commodities, the price of crude oil is also swayed by market supply and demand. However, because crude oil has the dual status of being a key strategic resource, its price is also substantially influenced by political, economic, diplomatic, and military factors. In sum, the price of crude oil futures is impacted by:

1.spot market factors;
2.speculation by investment funds;
3.exchange rate, interest rate, and capital liquidity;
4.emergencies and political factors.

Costs of Crude Oil Imported to Bonded Zones

China mainly uses the average of Platts Dubai and Oman prices as the pricing benchmark for crude oil imported from Middle East, and the Brent futures price for crude oil imported from West Africa.

The cost of crude oil imported to domestic bonded zones is generally calculated by the following formula:

Cost of imported crude oil in bonded zones = CIF × exchange rate + other expenses

- Exchange rate is based on the daily currency quotations;
- Other expenses include: import agency fees, port/dock charges, storage fees, commodity inspection fees, drayage, sanitation inspection fees, insurance, interest, urban maintenance and construction tax, educational surcharge, flood prevention fees, etc.

Crude oil traded on INE is based on “Net pricing, bonded delivery”, i.e., the trading price is net of VAT and customs duties. If the crude oil is transported from a bonded zone to within the territory of China, its price after tax (in RMB) will be as follows:

Crude oil price (incl. tax) = Bonded crude oil price × (1 + VAT rate) × (1 + Custom duty rate)

- VAT rate is 13%;
- Custom duty rate: 0 for the most favored nations; 85 yuan/metric ton otherwise.

*As of December 2021

HEDGING AND ARBITRAGE WITH CRUDE OIL FUTURES

Hedging with Crude Oil Futures

Hedging is a futures trading practice aimed to mitigate price risks in the spot market. To create a hedge, the trader buys (or sells) futures contracts whose underlying asset is of identical quantity to that sold (or bought), or to be sold (or bought), in the spot market, so that losses in the spot market will be favorably offset by gains in the futures market and vice versa. The offsetting mechanism between the spot commodity and futures commodity so established helps reduce the price risk.

1.Short Hedge by Oil Producers and Refineries

Oil producers and oil refineries, suppliers of crude oil and refined oil, respectively, have an interest to maintain a reasonable profit margin for the finished goods they are about to supply to the market and the in-process goods they intend to sell to the market in the future. To avoid potential losses at the actual time of sale due to price change, they can take a short hedge position on the corresponding futures product, i.e., first sell the same quantity of futures product, and then, at time of sale of the spot product, purchase the same quantity of futures product to close out their position.

Here is an example: an oilfield learned in July that the oil price was 350 yuan/barrel, which it believed to be quite favorable and increased its output as a result. However, the oilfield was also worried about an oversupply in the spot market would cause the oil price to fall, eroding its profit margin. To avoid the risk of falling prices, the oilfield decided to take a short hedge in crude oil futures on INE. This hedge and the resulting gains are illustrated below:

	Spot Market	Futures Market	Basis
July 1	Price of crude oil: ¥350 a barrel	10 lots of SEP crude oil contract sold at ¥370 a barrel	−¥20 a barrel
August 1	10,000 barrels sold at ¥325 a barrel	10 lots of SEP crude oil contract bought at ¥345 a barrel	−¥20 a barrel
Hedging Result	− ¥25 a barrel	+ ¥25 a barrel	
Net gain or loss: 0			

While the adverse price movement of RMB 25 a barrel in the spot market incurs a loss of RMB 250,000 to the oilfield, a gain by the same amount in the futures market has offset that, thereby eliminating the negative effect from the price change.

2.Long Hedge by Petroleum Product Processors and Refined Oil Consumers

Petroleum product processors and refined oil consumers – oil refineries, petrochemical companies, airlines, to name a few – are concerned about a price increase in crude oil or refined oil, which would raise their cost of raw materials. To avoid potential losses resulting from a price hike at time of purchase of such raw materials, they can take a long edge position in the futures market, i.e., first buy the same quantity of futures product, and then, at time of purchase of the relevant spot product, sell the futures product to close out their position.

Example: through a forward contract concluded on June 1, an oil refinery agreed to supply a local distributor with a shipment of goods in September. At the time of contract execution, the spot crude oil was trading at RMB 350 a barrel , and the oil refinery had neither the goods in stock nor any guaranteed source and price of raw materials. To control its cost and lock in profit, the oil refinery decided to enter into a crude oil futures trade on INE. The details of this trade are given below:

	Spot Market	Futures Market	Basis
June 1	Price of crude oil: ¥350 a barrel	10 lots of SEP crude oil contract bought at ¥370 a barrel	−¥20 a barrel
August 25	10,000 barrels bought at ¥375 a barrel	10 lots of SEP crude oil contract sold at ¥395 a barrel	−¥20 a barrel
Hedging Result	− ¥25 a barrel	+ ¥25 a barrel	
Net gain or loss: 0			

While the adverse price movement of RMB 25 a barrel in the spot market incurs a loss of RMB 250,000 to the oilfield, a gain by the same amount in the futures market has offset that, thereby eliminating the negative effect from the price change.

3.Hedging by Petroleum Product Dealers

Petroleum product dealers such as oil traders and storage and transportation service providers buy and sell spot commodities regularly. Because any mismatch in trading quantity and time will result in risks, petroleum product dealers often choose a hedging strategy based on their monthly net exposure in the spot market.

Arbitrage with Crude Oil Futures

Arbitrage is a trading strategy in which a trader simultaneously buys and sells two different futures contracts to seek profit from a favorable change in the basis between the contracts. Arbitrage includes calendar arbitrage and cross-product arbitrage.

1.Calendar Arbitrage

In calendar arbitrage, the trader seeks to make a profit by offsetting positions in two futures contracts with the same underlying asset but different delivery months when there is any unusual deviation from the normal basis between the two contracts. Calendar arbitrage can be classified into bull spread and bear spread.

In a bull spread with crude oil futures, the trader goes long on a nearby month contract and simultaneously goes short on a far month contract, and stands to profit when the price of the front month contract rises more than that of the far month contract. In a bear spread, by contrast, the trader would go short on a nearby month contract and go long on a far month contract, making a profit when the price of latter falls less than that of the former.

Bull Spread			
			Spread
May 1	10 lots of AUG crude oil contract bought at ¥350 a barrel	10 lots of OCT crude oil contract sold at ¥356 a barrel	¥6 a barrel
June 1	10 lots of AUG crude oil contract sold at ¥360 a barrel	10 lots of OCT crude oil contract bought at ¥362 a barrel	¥2 a barrel
Arbitrage Result	+ ¥10 a barrel	− ¥6 a barrel	
Net gain = (¥10 a barrel − ¥6 a barrel) × 10,000 barrels = ¥40,000			

The above example shows that, in a normal market, the success of an arbitrage hinges on a narrower spread in the future. For crude oil futures, the spread between two consecutive month contracts is generally decided by the monthly carrying charge for crude oil warrants. For two such contracts within the same crude oil production year, if the spread between them is both greater than, and expected to fall back to, the carrying charge, then a profit can be made by simultaneously selling the far month contract and buying the nearby month contract. A larger spread would also mean a lower risk and higher profit.

The situation for an arbitrageur reverses in an inverted market, where a larger spread in the future becomes profitable. Moreover, whereas in a normal market the spread between two consecutive months is tethered to the carrying charge, here the premium of the front month over the far month is not capped, meaning that an arbitrage can have a substantial payoff at limited risks.

Bear Spread			
			Spread
July 1	10 lots of OCT crude oil contract sold at ¥354 a barrel	10 lots of DEC crude oil contract bought at ¥355 a barrel	¥1 a barrel
August 1	10 lots of OCT crude oil contract bought at ¥350 a barrel	10 lots of DEC crude oil contract sold at ¥352 a barrel	¥2 a barrel
Arbitrage Result	+ ¥4 a barrel	− ¥3 a barrel	
Net gain = (¥4 a barrel − ¥3 a barrel) × 10,000 barrels = ¥10,000			

Unlike the earlier examples, in a bear spread, the success of the arbitrage in a normal market hinges on whether the spread will widen. If the spread between two consecutive month contracts is both less than, and expected to rise up to, the carrying charge, then a profit can be made by simultaneously buying the far month contract and selling the nearby month contract. The smaller the spread is, the lower the risk and the higher the profit will be.

If it were an inverted market, the arbitrage would be profitable from a narrowing spread. And as described earlier, because the spread between the nearby month contract and the far month contract in an inverted market will not be reined in by the carrying charge as in a normal market, an arbitrage in this type of market has limited profit potential but unlimited risk.

2.Cross-Product Arbitrage

Cross-product arbitrage is designed to generate profit from the price difference between two futures contracts with different but related underlying commodities. Specifically, the arbitrageur first buys one futures contract and simultaneously sells another of the same delivery month and for a related commodity, then waits for an opportune moment in the future to offset both to make profit. To be effective, a cross-product arbitrage must satisfy the following conditions: (1) the two commodities should be related and interchangeable to some extent; (2) the commodities should be affected by the same factors; and (3) the futures contracts being bought and sold should generally have the same delivery month.

- Arbitrage between related commodities

There is generally a reasonable spread between the prices of two related commodities. Any deviation from this reasonable spread creates arbitrage opportunities. For example, if the spread is expected to narrow, then buying the lower-price contract and selling the higher-price contract should generate a profit.

- Arbitrage between raw material and finished product

Normally there is a price difference between a raw material and any finished product made from such raw material. An arbitrage opportunity exists between these two commodities if this price difference deviates from the normal range. As is the case above, if the spread is expected to narrow, then buying the lower-price contract and selling the higher-price contract should generate a profit.

GUIDE TO CRUDE OIL FUTURES TRADING

Modes of Access

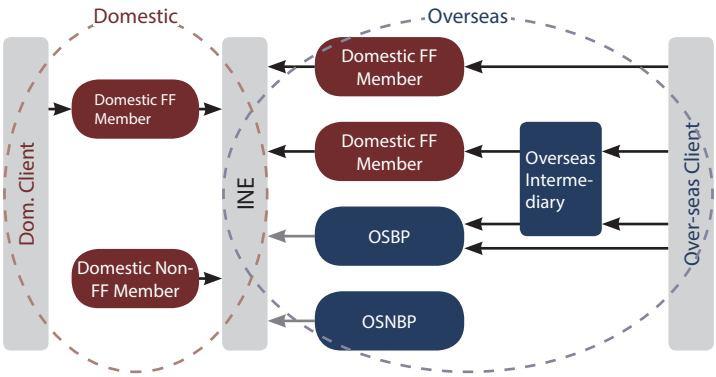
Domestic Investors

Domestic investors may trade crude oil futures through a domestic Futures Firm Member ("FF Member") or, for those that are eligible for INE membership, directly as a Non-Futures Firm Member ("Non-FF Member").

Overseas Investors

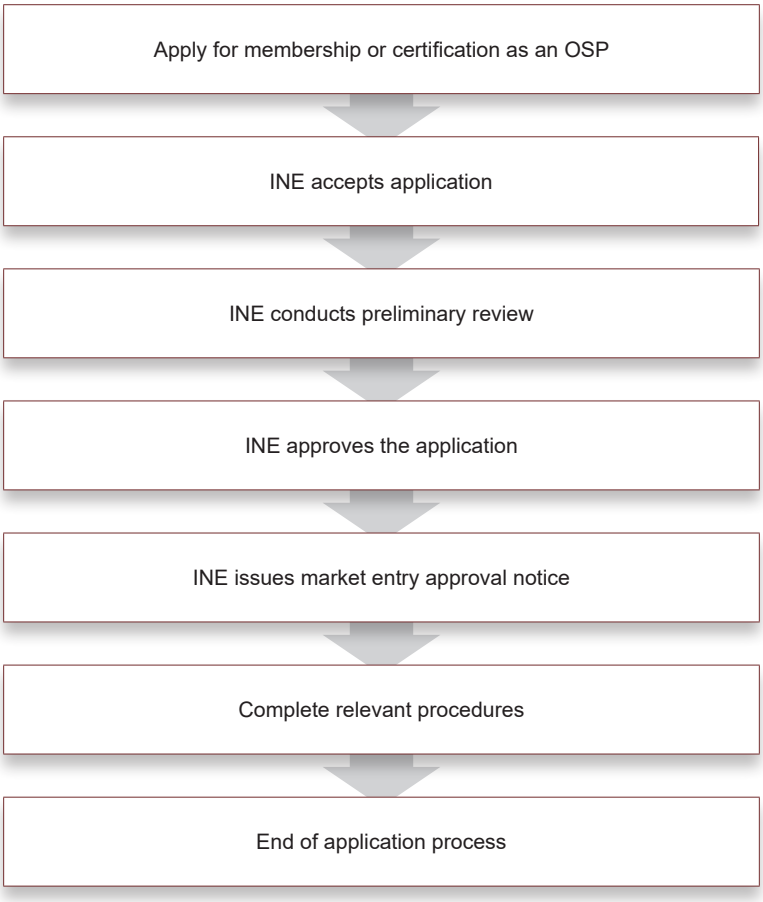
4 way of global participation accesses to INE are:

I: through domestic futures firms authorized as their direct agents
II: through Overseas Intermediaries who in turn engage domestic futures firms or Overseas Special Brokerage Participants ("OSBP")
III: through OSBPs as their agents
IV: as Overseas Special Non-Brokerage Participants ("OSNBP")



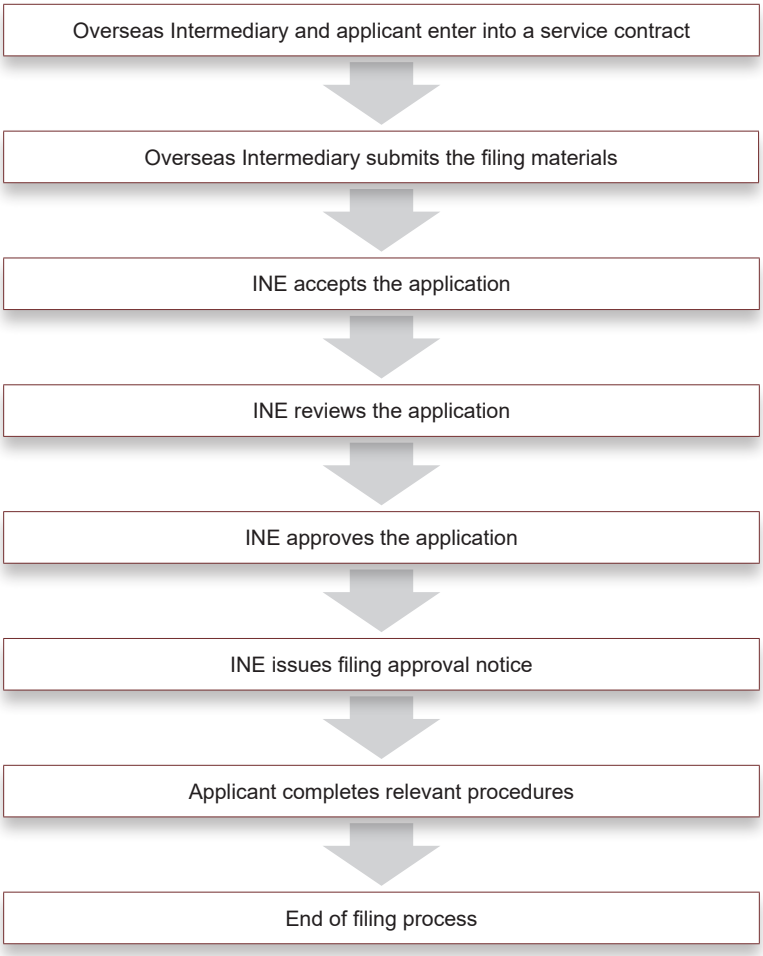
Note: Black arrows indicate direct access of trading, clearing and settlement. Grey arrows indicate direct access of trading directly, but clear and settle trades through a carry broker who must be a domestic FF Member.

Qualification Application Process for Members and Overseas Special Participants ("OSP")



Note: See INE official website for more details: Guideline → Members and Overseas Special Participants → Become A Member/ An OSP

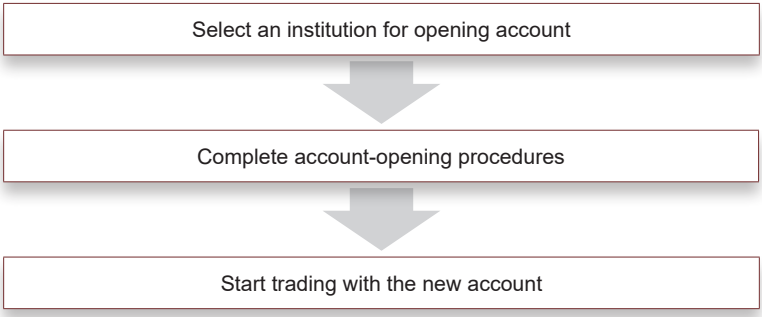
Filing Procedures for Overseas Intermediaries



Note: See INE official website for more details: Guideline → Members and Overseas Special Participants →Become A Member/ An OSP → Filing Procedures for Overseas Intermediaries

Account Opening Process for Clients

The client account-opening process consists of three steps: select an account-opening institution, open the account, and start trading with the new account. The second step can be further divided into three stages: preparation, application, and post-application procedures to be completed by the futures firm (or other account-opening institutions) in conjunction with CFMMC and INE.



Select an institution for opening account

Clients may select an account-opening institution from the list of futures firms, Overseas Special Brokerage Participants, and Overseas Intermediaries available on INE's website.

Note: Please go to INE website → Guideline → Members and Overseas Special Participants

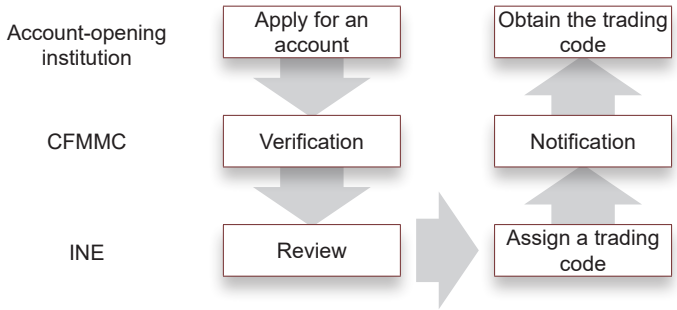
Complete account-opening procedures

1.Before opening an account, it is recommended to contact the account-opening institution to obtain the list of the documents needed on the day of application, such as identifications and other materials required by the account-opening institution. Note: These requirements may vary by the account-opening institution.

2.Visit the account-opening institution. Provide the required materials, complete the suitability assessment and other processes, and, after fully understand the account-opening documents and the risks of trading futures, sign the documents.

3.The account-opening institution will submit the client's application to CFMMC for review and verification. Upon approval, CFMMC will forward it to INE, who will conduct a second review and issue a trading code to the client. INE will send the results back to CFMMC, who will then forward the same to the client through the account-opening institution.

4.For details regarding the procedures of the account-opening institution, please visit the INE website → Guideline → Trading → Account Opening



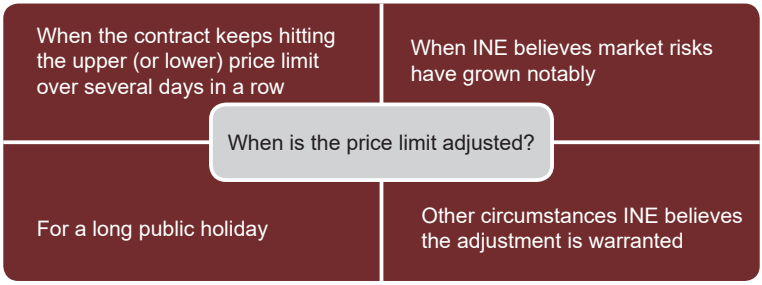
Start trading with the new account

Crude Oil Futures Trading Rules

Price Limit

Price limit refers to the highest or lowest transaction price permitted for a contract on a particular trading day. A quote beyond this range is deemed invalid and discarded.

Example: If SC1809 has a settlement price of RMB 500 yuan/bbl on a day, the permitted price range for the next trading day would be from 500.0 × (1−5%) to 500.0 × (1+5%), i.e., (475.0, 525.0).



Note: For details please visit the official INE website → Business Guideline → Trading Parameters (Futures)

Position Limit

Position limit refers to the maximum size of long or short positions specified by INE that may be held in a contract by a Member, OSP, Overseas Intermediary, or client.

- Positions are classified into general positions, hedging positions, and arbitrage positions. The percentage-based (i.e., relative) and fixed-amount (i.e., absolute) limits for general positions are detailed in the table below.
- Positions held by accounts linked by actual control relationship are aggregated for purposes of applying the position limit. Actual control relationship is identified in accordance with the criteria and procedures established by INE rules.
- Position limits for a contract vary over the course of its life.
- Both Members and clients are subject to position limits, either relative or absolute.
- For a client that has opened an account with multiple account-opening institutions, the aggregate positions held by the client through all such accounts may not exceed the position limit for a single client.
- A natural-person client unable to issue or accept the tax invoice prescribed by INE is not permitted to hold any open positions in an SC contract after the closing of the eighth trading day before the last trading day of the contract.

Percentage-based and Fixed-amount General Position Limits for Crude Oil Futures Contract over Its Life

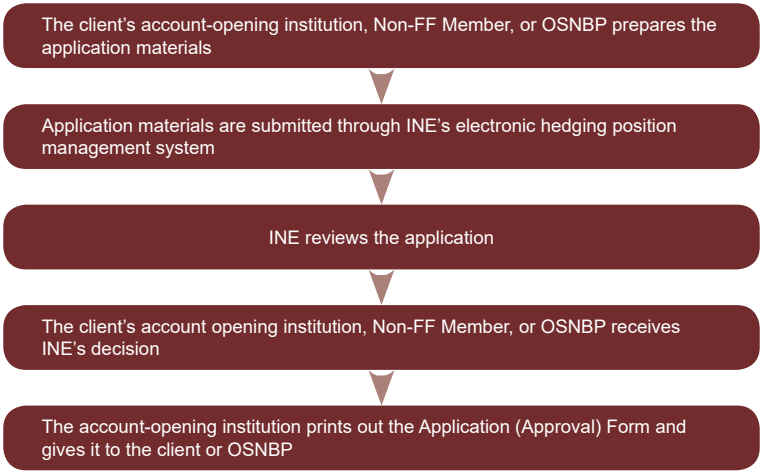
	From listing to the first month before the delivery month		From listing to the last trading day of the third month before the delivery month		Second month before the delivery month		Month before the delivery month	
	Total open Interest in a futures contract (lots)	Percentage-based position limit (%)	Fixed-amount position limit (lots)		Fixed-amount position limit (lots)		Fixed-amount position limit (lots)	
		FF Members, OSBPs, Overseas Intermediaries	Non-FF Members, OSNBPs	Clients	Non-FF Members, OSNBPs	Clients	Non-FF Members, OSNBPs	Clients
SC	≥ 75,000	25	3,000	3,000	1,500	1,500	500	500

Note: Open interest and the fixed-amount position limit are both on a single-counted basis (long or short).

Hedging Quota

If the general position limit is inadequate for those with hedging needs, certain Members and clients can apply for a hedging quota, subject to approval by INE.

Application procedures for hedging quota:



Application materials for hedging quota:

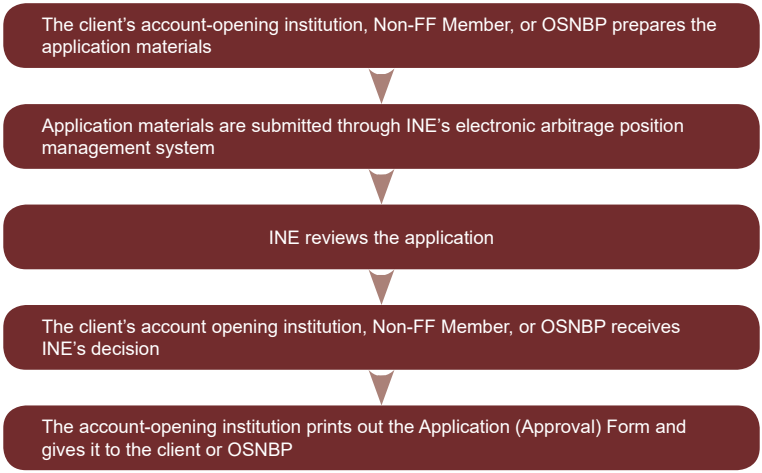
Hedging quota for regular months	Hedging quota for nearby delivery months
■ The Application (Approval) Form for Hedging Quota for Regular Months; ■ A copy of the business license, certificate of incorporation, or other documents which show the applicant's scope of business; ■ Overview of the production and trading of physical commodities in the previous year or the latest audited annual financial report; ■ A business plan of physical commodities for the current year or the following year, and any purchase and sale contracts or other valid certificates related to the application for hedging; ■ The hedging strategy; ■ Hedging management rules, if the applicant is a Non-FF Member or an OSNBP; ■ Other materials required by INE.	■ The Application (Approval) Form for Hedging Quota for Nearby Delivery Months; ■ A copy of the business license, certificate of incorporation, or other documents which show the applicant's scope of business; ■ Relevant materials that demonstrate the authenticity of the hedging needs, including the production plan for the current year or the previous year, warrants for physical commodities, processing orders, purchase and sale contracts, purchase and sale tax invoices, or other valid certificates of the ownership of physical commodities corresponding to the application quota; ■ Hedging management rules, if the applicant is a Non-FF Member or an OSNBP; ■ Other materials required by INE.

Notes: 1. Regular months are the period from the listing day of the contract to the last trading day of the third month before the delivery month. Application for hedging quota for regular months should be submitted within this period. Nearby delivery months are the second and the first months before the delivery month. Application for hedging quota for nearby delivery months should be submitted within the period from the first trading day of the fourth month before the delivery month to the last trading day of the second month before the delivery month.
2. More details are available on INE website → Business Guideline → Trading → Hedging Guideline

Arbitrage Quota

If the general position limit is inadequate for those with arbitrage needs, certain Members and clients can apply for an arbitrage quota, subject to approval by INE.

Application procedures for arbitrage quota:



Application materials for arbitrage quota:

Arbitrage quota for regular months	Arbitrage quota for nearby delivery months
■ An Application (Approval) Form for Arbitrage Quota for Regular Months; ■ The arbitrage trading strategies, specifying the source and size of funding and whether the transactions would be calendar spread arbitrage or cross-product arbitrage; ■ Other materials required by INE.	■ An Application (Approval) Form for Arbitrage Quota for Nearby Delivery Months; ■ The arbitrage trading strategies, specifying the source and size of funding, whether the transactions would be calendar spread arbitrage or cross-products arbitrage, the arrangement for position establishment and reduction, and intention of delivery, etc.; ■ Price deviation analyses for the contract(s) concerned; ■ Other materials required by INE.

Note: 1. Regular months are the period from the listing day of the contract to the last trading day of the third month before the delivery month. Nearby delivery months are the second and the first months before the delivery month. Application for arbitrage quota for nearby delivery months should be submitted within the period from the first trading day of the third month before the delivery month to the last trading day of the second month before the delivery month.
2. More details are available on INE website → Business Guideline → Trading → Arbitrage Guideline

Forced Position Liquidation

INE may force-liquidate the positions held by Members, OSPs, Overseas Intermediaries, and clients if they did not meet the margin call on time or falls under other violations or circumstances specified by INE.

INE carries out forced liquidation if:

- The clearing deposit balance of a Member falls below 0 and the Member fails to meet the margin requirement by the time specified;
- The open positions held by the subject have exceeded the applicable position limit;
- The open positions held by the subject have not been adjusted to the corresponding integer multiple within the specified time as required or failed to meet the delivery requirements;
- The forced liquidation is warranted as the response for a violation;
- It is warranted as part of the emergency actions taken by INE;
- There is any other circumstance that necessitates the forced liquidation.

Forced liquidation should be performed by Members and OSPs first, within the first trading session on a trading day unless otherwise specified by INE. If forced liquidation is not completed within this period, INE will carry it out itself.

Gains arising from forced liquidation are handled in accordance with relevant rules. Any costs and losses incurred, including any additional losses arising from failed forced liquidation due to market reasons, are solely borne by the subject of forced liquidation.

TAS Order

Trading at Settlement (“TAS”) order allows a trader to, during the specified trading session, place an order to buy or sell a futures contract at its current day’s settlement price or at that price plus or minus some ticks.

Basic information

- Definition: TAS order is a new trading order available at INE. It is a trading order at the current day’s settlement price of an eligible contract.
- Order matching rules: TAS orders can only be matched with other TAS orders for the same contract. During central (i.e., call) auction, TAS orders are matched in a way that maximizes the trading volume; during continuous trading, TAS orders are matched by price-time priority.
- Execution price: Once a TAS order is executed, the execution price is calculated by the matching rules and finalized after the daily settlement price of the relevant contract is established.
- Order properties: For eligible contracts, a TAS order may be indicated as “open,” “close today,” or “close previous”; and “general” or “hedging.”
- Type: TAS orders are limit orders and cannot at this time be additionally flagged as either fill-or-kill (FOK) or fill-and-kill (FAK).
- Trading hours: TAS orders are available during the call auction and the first trading session (including the continuous trading hours. Currently the first trading session runs till 10:15 a.m.). At the end of the first trading session, all unfilled TAS orders are automatically canceled by the system.

Examples

- Opening New Position: Example 1

Assuming a client has no existing position in SC2008 and places a TAS order for 40 lots in SC2008 as “long, general, open,” which is then matched with an existing TAS order for short 15 lots. As a result, the client will hold 15 lots of long, general, and today’s position in SC2008. The remaining 25 lots will be automatically canceled by the system if they cannot be matched within the first trading session.

If at market close the settlement price of SC2008 is determined to be ¥500/barrel, then the 15 lots filled through the TAS order will be traded at ¥500/barrel.

- Opening New Position: Example 2

Assuming a client has no existing position in SC2009 and submits a TAS "short, general, open" order for 5 lots. After it is filled, the client will hold 5 lots of short, general, and today's position in SC2009. If now the client places and executes a limit order for 3 lots of SC2009 as "long, general, and close today," then the client will hold 2 lots of short, general, and today's position in SC2009.

If at market close the settlement price of SC2009 is determined to be ¥515/barrel, then the 5 lots filled through the TAS order will be traded at ¥515/barrel.

- Closing Out Today's Position

Assuming a client has no existing position in SC2009, and submits a limit order for 10 lots of SC2009 as "short, general, and open." After 4 lots are filled, the client will hold 4 lots of short, general, and today's position in SC2009. If the client then places and executes a TAS "long, general, close today" order for 1 lot, it will hold 3 lots of short, general, and today's position in SC2009.

If at market close the settlement price of SC2009 is determined to be ¥510/barrel, then the 1 lot filled through the TAS order will be traded at ¥510/barrel.

- Closing out Previous Day's Positions

Assuming a client holds 50 lots of long, hedging, and previous day's position in SC2010 and submits a TAS "short, hedging, close previous" order for 50 lots. Once 40 lots of the order are filled, the client will hold 10 lots of long, hedging, and previous position in SC2010.

If at market close the settlement price of SC2010 is determined to be ¥520/barrel, then the 40 lots filled through the TAS order will be traded at ¥520/barrel.

Remarks

- A TAS order is subject to the same trading access requirements, minimum and maximum order sizes, minimum and maximum order sizes for delivery month (if any), position limit, hedging quota, and trading limit as the other orders for the corresponding eligible contract.

- If a TAS-eligible contract is trading at the limit price, TAS orders in the contract will not be matched by the principle of “close-out orders first,” and will not affect the determination of Limit-locked Market.

- Market data of TAS-eligible contracts published during the trading hours do not include the turnover or trading volume from TAS transactions. Statistics following market close and settlement do reflect TAS transactions in the turnover and trading volume of the corresponding eligible contracts.

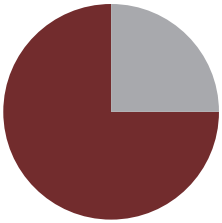
Note: More details are available on INE website → Business Guideline → Trading → TAS Guideline

Crude Oil Futures Settlement and Margin Rules

Settlement refers to the process in which a Member's trading margin, profit or loss, transaction fee, delivery payment, and other payables and receivables are calculated and credited into or debited from its account based on the trading results and INE rules. The clearing currency at INE is Renminbi: A Member should pay the minimum clearing deposit in RMB with its own funds; all the payments including profit or loss, fees, and delivery payments must be paid in cash in RMB.

Margin requirement

Margin classification



Dedicated margin account

■ Trading margin: The portion of deposited funds already used as margin for the positions held.

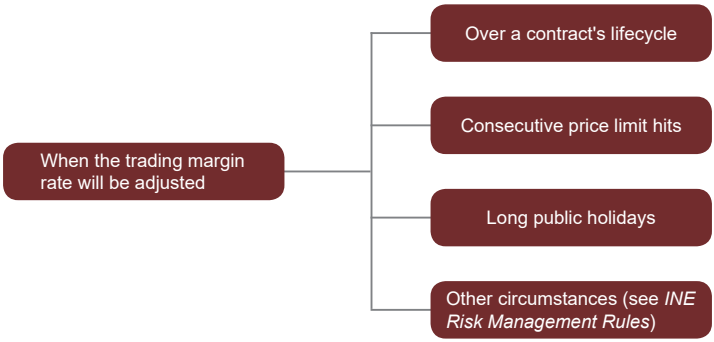
■ Clearing deposit: The portion of deposited funds not yet used as margin for the positions held.

INE

Each FF Member is required to maintain a minimum clearing deposit of ¥2,000,000 at all times.

Each Non-FF Member is required to maintain a minimum clearing deposit of ¥500,000 at all times.

Adjustment of the trading margin rate



The rate of trading margin for a crude oil futures contract varies over the contract's lifecycle. The baseline margin rates are available on the INE website (Data → Settlement Parameters).

	Lifecycle Stage	Trading margin rate
Crude oil	From listing	Baseline margin rate
	From the first trading day of the month before the delivery month	10%
	From the second trading day before the last trading day	20%

Once the limit price is hit, INE may adjust the trading margin requirement for the corresponding SC contract in accordance with its rules. If a contract reaches the limit price on D1, then:

	D1	D2	D3
Margin rate at daily clearing on the current day	+2% (percentage points) on top of the price limit on D2	+2% on top of the price limit on D3	Determined based on INE's risk management plan

Note: If two or more trading margin rates are applicable to a futures contract, the highest one governs. The daily margin rate for each contract can be found on the INE website → Data → Settlement Parameters.

The INE website only shows the margin rates applicable to Members. The margin rates for clients are determined by their carrying futures firms.

Larger-side margining

INE may collect trading margin on the long positions only or the short positions only, if

- A Client holds both long and short positions in futures contracts of the same product through the same Member or OSBP (except for positions held after the close of the fifth trading day before the last trading day of the relevant contract); in which case, margin is collected from the side for which a larger amount of trading margin is required;
- A Non-FF Member or an OSNBP holds both long and short positions in futures contracts of the same product (except for positions held after the close of the fifth trading day before the last trading day of the relevant contract); in which case, margin is collected from the side for which a larger amount of trading margin is required;
- Other circumstances that larger-side margining is considered necessary by INE.

Note: Please refer to Chapter 2 of the *INE Risk Management Rules* for detailed rules on the margin requirements for crude oil futures and how it is collected.

Assets usable as margin

Subject to INE's approval, Non-FF Members, OSNBPs, and clients may use standard warrants, foreign currencies, Chinese government bonds, and other designated assets as margin collaterals. For any asset other than foreign currencies, the maximum available margin derived from the asset is capped at four times the cash balance of the relevant account.

Standard warrants

- The minimum haircut for standard warrants used as margin is 20% of their market value;
- The market value is calculated based on the current day's settlement price of the front-month futures contract of the underlying product;
- Before market close of the day the standard warrants are posted as margin collateral, their market value is provisionally calculated based on the previous settlement price of the front-month futures contract of the underlying product;
- The application for posting standard warrants as margin should be submitted from 9:00 to 15:00 and from 21:00 to 02:30 (next day); the application for withdrawing them should be submitted between 9:00 and 14:30.

Foreign currencies

- INE currently permits the use of U.S. dollar as margin at a haircut of 5%;
- The market value of foreign currencies is calculated based on the Central Parity Rate for the day published by the China Foreign Exchange Trade System;
- The application for posting foreign currencies as margin should be submitted from 8:00 to 15:00 and from 20:15 to 02:30 (next day); the withdrawal of foreign currencies is processed at clearing and settlement.

Note: Detailed rules regarding margin collaterals can be found in Chapter 6 of the *INE Clearing Rules*.

Chinese government bonds

INE currently permits the use of book-entry government bonds (i.e., Chinese treasury bonds) issued domestically by the Ministry of Finance of the People's Republic of China as margin.

In each instance where Chinese government bonds are posted as margin, the total face value should not be less than one million yuan (¥1,000,000).

The benchmark price of Chinese government bonds is taken to be the lowest of the valuations provided by depositories. At daily clearing, INE will use the benchmark price (net price) of the Chinese government bonds on the preceding trading day to calculate the market value.

The application for posting Chinese government bonds as margin should be submitted between 9:00 and 14:30; withdrawal request is processed from 9:00 to 14:30.

Note: Detailed rules regarding margin collaterals can be found in Chapter 6 of the *INE Clearing Rules*.

Account and Margin Management

Account segregation

INE maintains an internal ledger for each Member to record and settle the Member's deposits and withdrawals, profits and losses, trading margins, transaction fees, etc. on a daily basis.

Similarly, FF Members, OSBPs, and Overseas Intermediaries are each required to maintain an internal ledger for each of their clients to record and settle their payables and receivables on a daily basis.

Futures-related funds transfers between an FF Member and its clients must only be carried out between the FF Member's dedicated margin account and the clients' futures settlement accounts.

Designated Depository Banks

In view of the prudential principles, INE has designated qualified banks to keep the custody of futures margin funds. These Designated Depository Banks are required to do so in compliance with laws, regulations, ministry-level rules, and rules of INE and accept the supervision of INE.

As of January 2022, INE has designated 12 domestic banks and 10 overseas banks as Depository Banks.

Domestic Designated Depository Banks	Overseas Designated Depository Banks
ICBC, BOCOM, China Construction Bank (CCB), Bank of China (BOC), Agricultural Bank of China (ABC), Shanghai Pudong Development Bank (SPDB), Industrial Bank (CIB), China Everbright Bank (CEB), China Merchants Bank (CMB), China CITIC Bank (CITIC), China Minsheng Bank (CMBC), Ping An Bank.	ICBC, BOCOM, CCB, BOC, ABC, CMB, CITIC, SPDB, CEB, DBS Bank

Note: The latest list of Designated Depository Banks is available on the INE website → Guideline → Settlement → Depository Banks.

Funds Deposit and Withdrawal

- Deposit

Members may submit funds deposit requests at any time during the day.

The system automatically reviews deposit requests from 08:00 to 15:00 and from 20:15 to 02:30 (next day) on a trading day.

- Withdrawal

Members may submit funds withdrawal requests at any time during the day.

Requests submitted before 15:00 will be reviewed by INE on the current day during daily clearing.

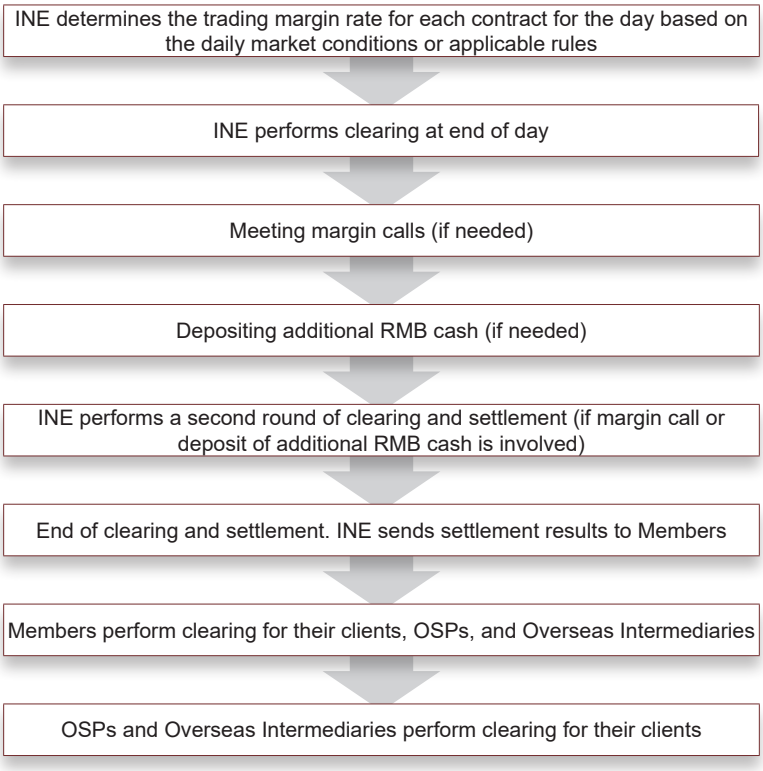
Requests submitted after 15:00 will be reviewed by INE at time of clearing on the next day.

Daily Clearing

INE implements daily mark-to-market, i.e., after the close of each trading day, INE will settle the profit or loss, trading margin, transaction fees, taxes, and other fees for each Member based on the settlement price of each contract, and transfer the net amount of the Member's payables and receivables by crediting or debiting the Member's clearing deposit accordingly.

INE only performs clearing for Members. Each Member performs clearing for its clients, the OSPs that have asked the Member to clear on their behalf, and the Overseas Intermediaries that have asked the Member to trade and clear on their behalf.

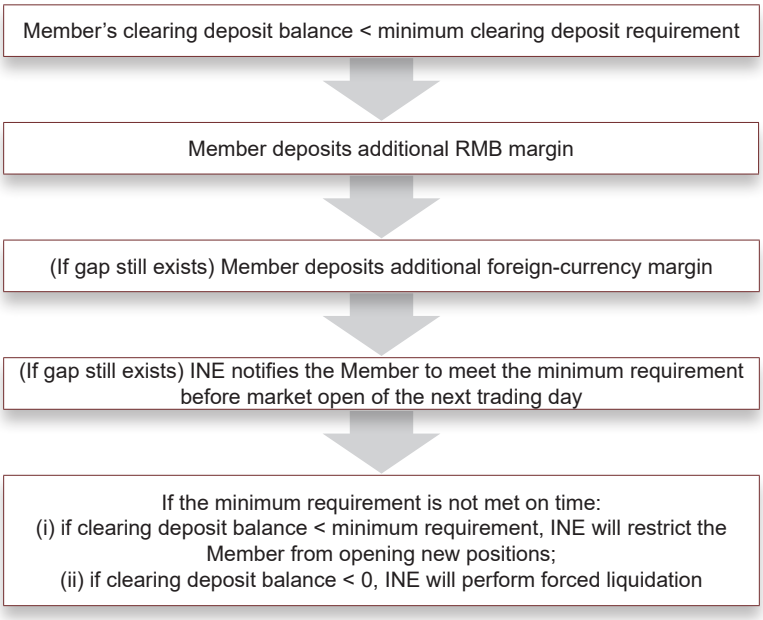
Daily Clearing Process



Clearing Risk Control

- Margin call

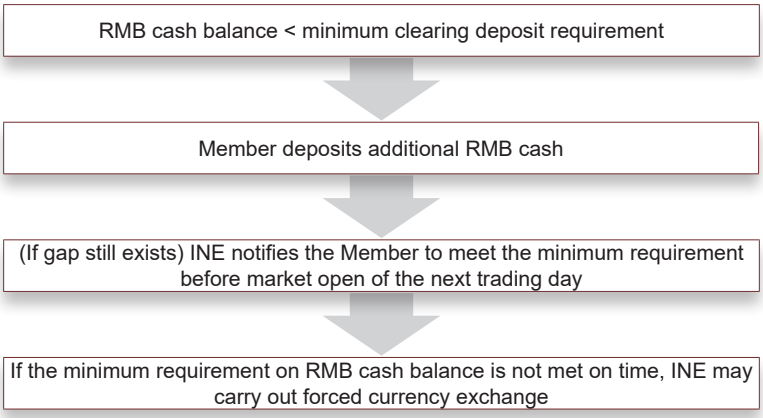
If, after the completion of daily clearing, the clearing deposit balance of a Member on any ledger at INE is lower than the minimum required, INE will issue a margin call to the Member and the additional amount required will be deducted from the Member's dedicated fund account. If a shortfall still exists, the Member should eliminate it before market open of the next trading day, or will be penalized by such measures as restriction on opening new positions and forced liquidation.



Note: Detailed rules regarding margin call can be found in Chapter 3 of the *INE Clearing Rules* and Chapter 6 of the *INE Risk Management Rules*.

■ RMB margin call

If, after the completion of daily clearing, the RMB (which is the settlement currency) clearing deposit balance of a Member on any ledger at INE is lower than the minimum required, INE will issue a call for additional RMB margin funds. If the requirement is not met on time, INE may unilaterally exchange foreign-currency margin into RMB margin.



■ Risk reserve

INE establishes a risk reserve to ensure smooth operations of the futures market, provide financial security, and cover any potential losses from unforeseeable risks.

Sources of funding for the risk reserve include:

(1) funds provisioned from and at 20% of the transaction fees INE collects, accounted as administrative expenses;

(2) other sources in compliance with the fiscal policies of China.

The use of the risk reserve is subject to the approval of the INE board of directors, and, following notification to the CSRC, carried out in accordance with the prescribed purposes and procedures.

Abnormal Trading and Account Relationship Filing

Large Trader Position Reporting

INE institutes large trader position reporting. A Member, OSP, or client whose general position in a futures contract reaches the general position limit set by the INE, or an Overseas Intermediary whose general position in a futures contract reaches or exceeds 60% of its general position limit, is required to file a report with INE on the following trading day. INE may adjust the reportable threshold based on market risks.

Members, OSPs, Overseas Intermediaries, and clients should ensure that the large trader position reports and other related documents they submit are truthful, accurate, and complete.

Actual Control Relationship

"Actual control" refers to the action or ability of any person (whether an individual or institution) to control or to significantly influence the trading decisions of another person (whether an individual or institution) by virtue of its powers including the power to manage, use, receive incomes from, or dispose of the futures account of the latter person. By the principle of "substance over form," a person is treated as having actual control over the futures account of another person during futures trading if any condition listed under Article 5 of the *INE Administration of Accounts Involving Actual Control Relationship Rules* is met.

(1) Clients with accounts involving actual control relationship as defined by the identification criteria should complete account filing within 10 trading days after signing the futures brokerage contract.

(2) INE may impose supervisory measures against clients who fail to make filing truthfully. In serious circumstances, INE will take further actions in accordance with the *INE Enforcement Rules*.

Abnormal Trading Behavior

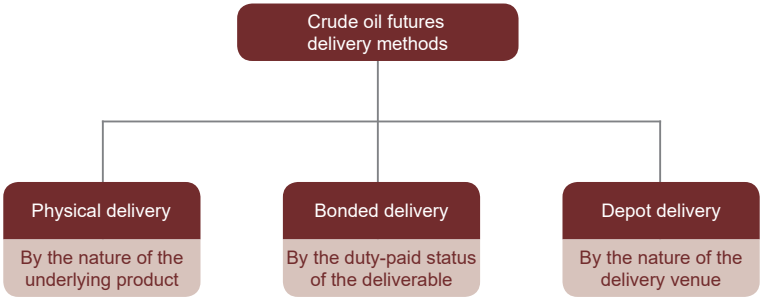
Abnormal trading behavior includes self-trades, frequent order cancellation, large-amount order cancellation, exceedance of the daily position-opening limit, disruptive program trading, and other situations identified by the CSRC or INE.

Activities such as self-trade, frequent order cancellations, and large-amount order cancellation resulting from such transactions as hedging trades, FOK orders and FAK orders are not treated as abnormal trading behaviors.

Similarly, frequent order cancellations resulting from market making activities are not treated as abnormal trading behaviors.

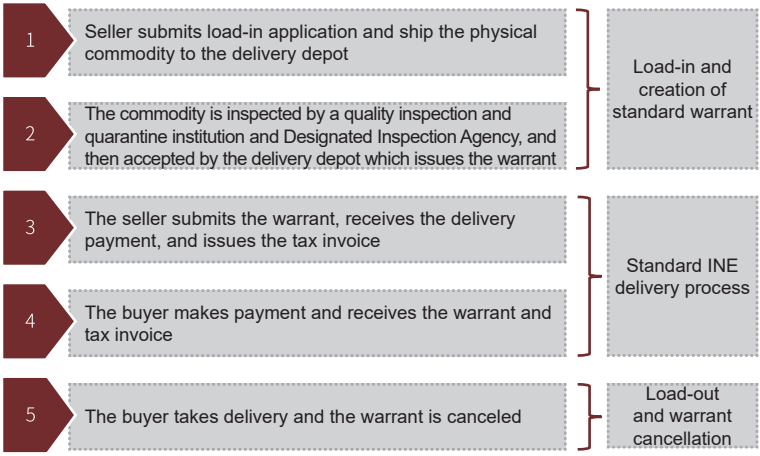
CRUDE OIL FUTURES DELIVERY GUIDE

Delivery is a way that a buyer and a seller settle their open positions in a futures contract by either transferring the ownership the underlying commodity or completing a cash settlement at the prescribed settlement price in accordance with the rules and procedures of INE.



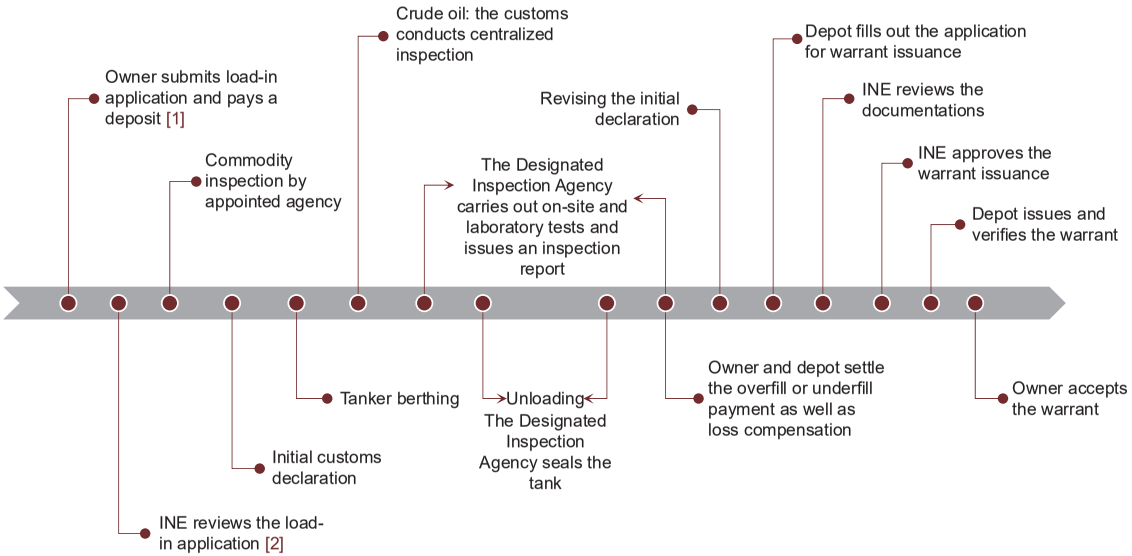
Basic Delivery Procedures

Basic procedures for delivery against crude oil futures



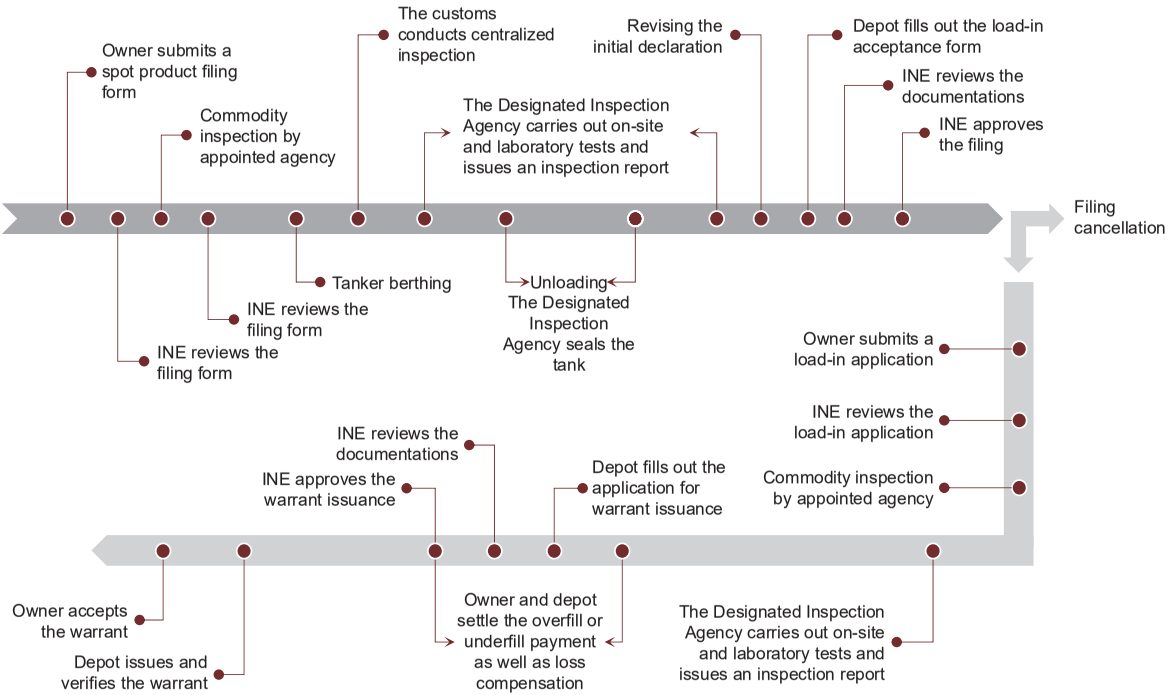
Standard Warrant Creation Process

Crude Oil Directly Delivered to China from A Foreign Origin



Notes:
1. The information in the load-in application must be accurate.
2. Designated delivery depots may print out a *Load-in Approval/Notification*.

Conversion of Spot Product on File into Standard Warrant

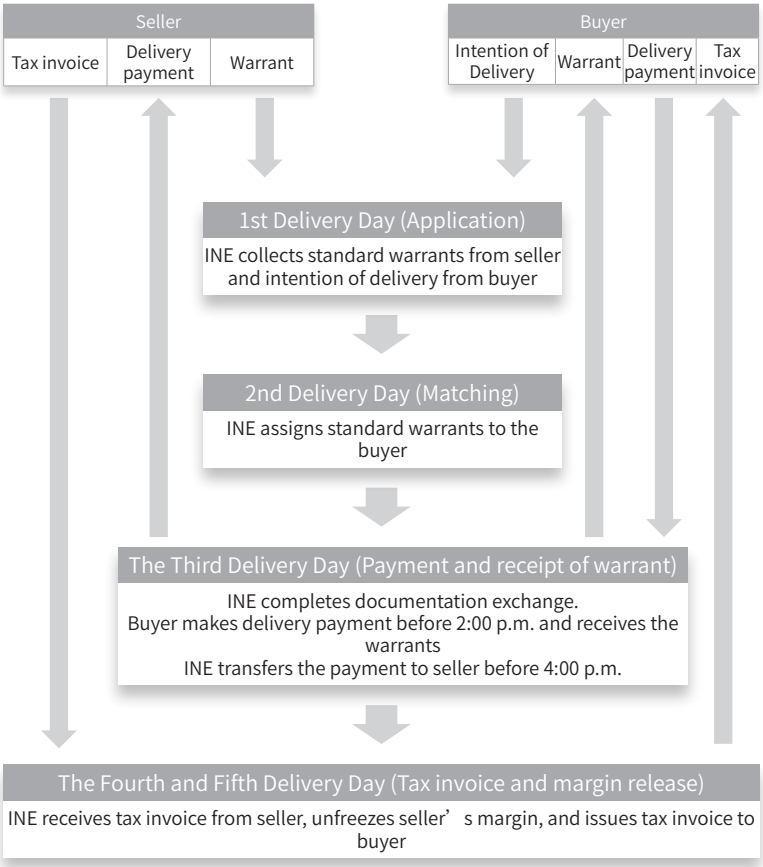


Documentations Required for the Creation of Standard Warrants

1. Certificate of Origin
2. Bill of lading
3. Certificate of inspection at the port of loading
4. Load-in approval
5. Customs declaration for imported goods
6. Inspection and Quarantine Certificate for Entry Goods (Crude oil)
7. Inspection Certificate issued by a Designated Inspection Agency
8. Other materials: Based on the transaction in question

Warrant Usage and Cancellation

Standard Delivery Procedures



Warrant Transfer Procedures and Requirements

Standard Warrant Transfers Settled by INE

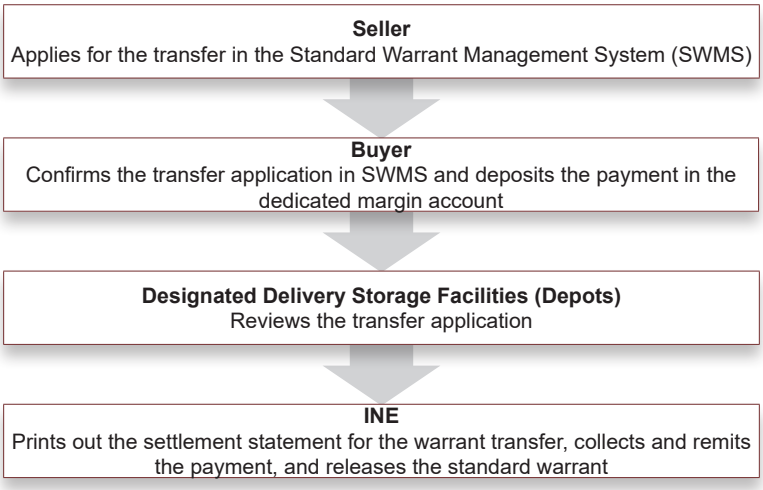
1.Enterprises qualified to import or export crude oil and overseas enterprises may transfer bonded standard warrants for crude oil.

2.Other enterprises should engage in warrant transfers as follows:

(1)For a purchase transaction, the purchased bonded standard warrant can be used for delivery at contract expiration, sold through EFP, or used for load-out and direct customs declaration, but may not be sold in another warrant transfer transaction.

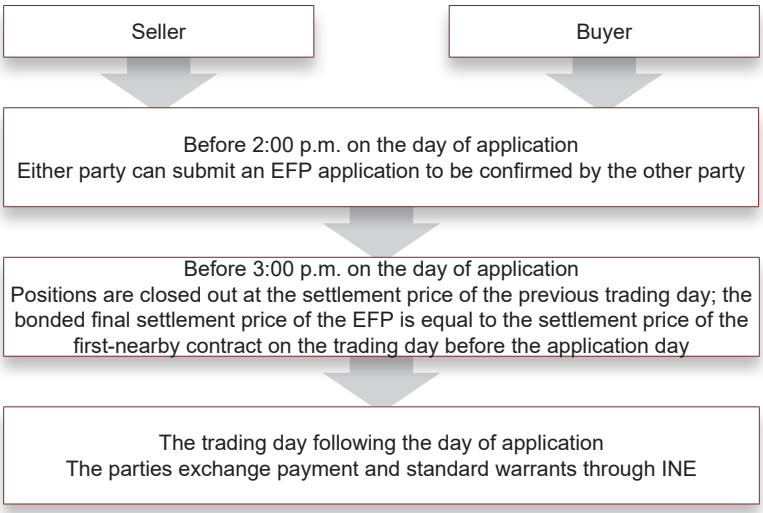
(2)For a sales transaction, the sold bonded standard warrant should be obtained from delivery at contract expiration or an EFP transaction, or created as a result of load-in, but may not be obtained through the transfer of a purchased bonded standard warrant.

■ If the application for transferring standard warrants is submitted before 2:00 p.m., INE will complete the transfer on the same day. For applications submitted after 2:00 p.m., INE will complete the transfer on the following trading day.



Exchange of Futures for Physical (EFP)

INE Settlement of EFP with Standard Warrants



Non-INE Settlement of EFP with Non-Standard Warrants

1.If both the buyer and seller are domestic entities and the deliverable is crude oil declared for import by the seller, then the payment should be made in renminbi;

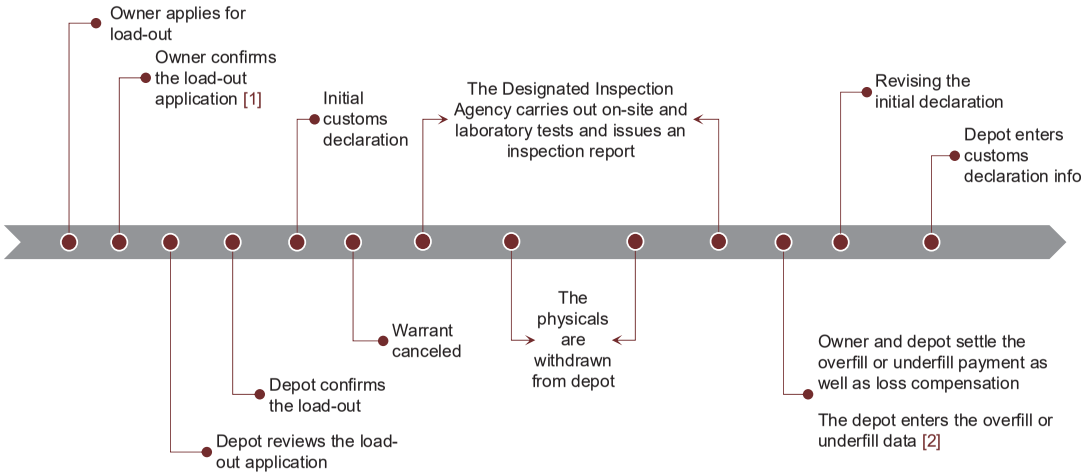
2.If the buyer is a domestic entity and the seller is an overseas entity and the deliverable is crude oil declared for import by the buyer, then the payment can be made in either renminbi or a foreign currency.

- EFP is only applicable to positions in INE-listed futures contracts opened before the date of the EFP application, not to the positions established on that day.

- Application period: From the listing date of the futures contract concerned till the second trading day (inclusive) before the last trading day.

Cancellation of Warrants

Take-delivery can be conducted once the warrants are canceled.

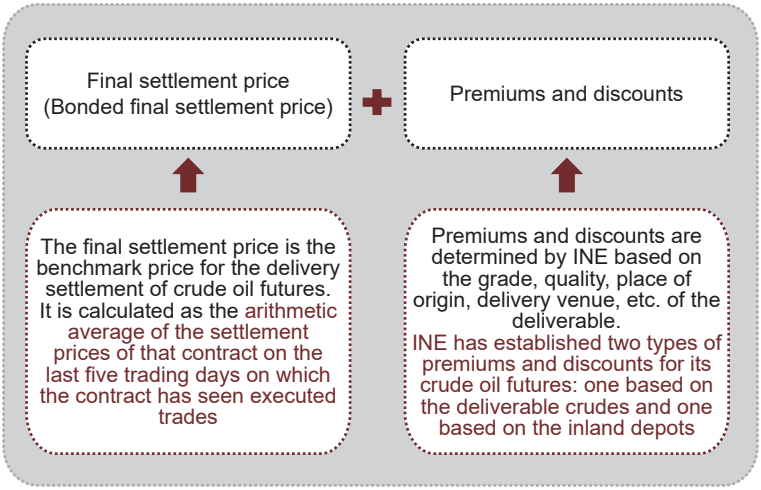


Notes:
1.A Designated Delivery Storage Facility (depot) may print out the *Bonded Standard Warrant List and the Bonded Delivery Settlement Statement (For Customs Declaration-1)* and, in the case of an import declaration, the *Crude Oil (Futures) Inspection and Quarantine Application Form.*
2.A Designated Delivery Storage Facility (depot) may print out the *Bonded Delivery Settlement Statement (For Customs Declaration-2)* and, in the case of an import declaration, the *Crude Oil (Futures) Deregistration Application Form.*

Delivery-Related Fees

Delivery Payment for Expired Contract

Once an expired contract enters the delivery phase, the buyers and the sellers will settle the delivery payment at the contract's final settlement price plus or minus the premium/discount for the deliverable.



Delivery payment for expired contract = (bonded final settlement price + premiums and discounts of the deliverable crude) × delivery quantity

Other Fees

Delivery fees	0 (temporarily exempted)
Storage fees	RMB 0.2 / barrel • day (Effective from January 1, 2022) Collected by the Designated Delivery Storage Facilities from the owner or its agent Subject to adjustment in light of market needs
Inspection fees	Collected by the Designated Inspection Agency at the prevailing rate from the owner as at the time of load-in/load-out or from its agent
Other fees	Port charges, port construction fees, terminal handling charges, etc. Collected by relevant organizations at the prevailing rate from the owner as at the time of load-in/load-out or from its agent

Note: More Details are available on INE website → Circular

Disclosure of Delivery Information

Daily Warrants Information

Medium Sour Crude Oil — unit: barrel

Region	Depot	On Warrant	Chg
Shanghai	Yangshan Oil	190000	0
Zhejiang	SPRC Cezidao	0	0
	Sinochem-Xingzhong	0	0
	Dading Petroleum	0	0
	Subtotal	0	0
Shandong	SPRC Rizhao	495000	0
	SPG Qingdao port Shihua	0	0
	Sinochem-Hongrun	2197000	0
	SPG Mercuria	0	0
	Subtotal	2692000	0
Guangdong	PetroChina Zhanjiang	0	0
	SPRC Zhanjiang	0	0
	Subtotal	0	0
Liaoning	PetroChina Dalian Bonded	1298000	0
	PetroChina Dalian Intl	1877000	0
	North Pertroleum	0	0
	Subtotal	3175000	0
Hainan	SPRC Hainan	0	0
Guangxi	PetroChina Guangxi Intl	230000	0
Hebei	SPRC Caofeidian	0	0
Total		6287000	0

Note: More details are available on the INE website → Data → Futures → Daily & Weekly

Weekly Inventory

Medium Sour Crude Oil — Unit: barrel

Region	Depot	Crude	Storage of last week	Storage of this week	Storage Change	Theoretical Available Capacity		
						last week	this week	Change
Shanghai	Yangshan Oil		190000	190000	0	--	--	--
	Yangshan Oil		190000	190000	0	1070000	1070000	0
	Subtotal		190000	190000	0	1070000	1070000	0
Zhejiang	SPRC Cezidao		0	0	0	--	--	--
	SPRC Cezidao		0	0	0	3500000	3500000	0
	Sinochem-Xingzhong	Upper Zakum	0	0	0	--	--	--
	Sinochem-Xingzhong		0	0	0	--	--	--
	Sinochem-Xingzhong		0	0	0	2101000	2101000	0
	Dading Petroleum		0	0	0	--	--	--
	Dading Petroleum		0	0	0	1300000	1300000	0
	Subtotal		0	0	0	6901000	6901000	0
Shandong	SPRC Rizhao	Upper Zakum	433000	433000	0	--	--	--
	SPRC Rizhao		62000	62000	0	--	--	--
	SPRC Rizhao		495000	495000	0	4705000	4705000	0
	SPG Qingdao port Shihua	Oman	0	0	0	--	--	--
	SPG Qingdao port Shihua		0	0	0	2392000	2392000	0
	Sinochem-Hongrun	Upper Zakum	20000	20000	0	--	--	--
	Sinochem-Hongrun	Oman	0	0	0	--	--	--
	Sinochem-Hongrun		2177000	2177000	0	--	--	--
	Sinochem-Hongrun		2197000	2197000	0	15803000	15803000	0
	SPG Mercuria		0	0	0	--	--	--
	SPG Mercuria		0	0	0	2392000	2392000	0
	Subtotal		2692000	2692000	0	25292000	25292000	0

Note: More details are available on the INE website → Data → Futures → Daily & Weekly

STANDARD CONTRACT

Contract Specifications

Product	Medium Sour Crude Oil
Contract Size	1,000 barrels per lot
Price Quotation	(RMB) Yuan per barrel (no tax or duty included in the quotation)
Minimum Price Fluctuation	0.1 Yuan / barrel
Daily Price Limits	±4% from the settlement price of the previous trading day
Listed Contracts	Monthly contracts of recent twelve (12) consecutive months followed by eight (8) quarterly contracts.
Trading Hours	9:00-11:30 a.m., 1:30-3:00 p.m. (Beijing Time), and other trading hours as prescribed by the Exchange
Last Trading Day	The last trading day of the month prior to the delivery month; The Shanghai International Energy Exchange is entitled to adjust the last trading day in accordance with the national holidays.
Delivery Period	Five (5) consecutive trading days after the last trading day.
Grades and Quality Specifications	Medium sour crude oil with the quality specifications of API 32.0 degrees and sulfur content 1.5% by weight. The deliverable grades and the price differentials will be stipulated separately by the Shanghai International Energy Exchange.
Delivery Venues	Delivery Storage Facilities designated by the Shanghai International Energy Exchange
Minimum Trading Margin	5% of contract value
Settlement Type	Physical delivery
Product Symbol	SC
Listing Exchange	Shanghai International Energy Exchange

Note: The product symbol “SC” is short for SHANGHAI CRUDE or SOUR CRUDE.

Contract Appendixes

Delivery Unit

The delivery unit of standard crude oil futures contract is 1,000 barrels. The delivery quantity shall be integer multiple(s) of the delivery unit.

Last Trading Day

The Last Trading Day of a crude oil futures contract shall be the last trading day of the month prior to the delivery month. The Shanghai International Energy Exchange (the "Exchange") reserves the rights to adjust the Last Trading Day in accordance with the national holidays so as to protect the legitimate rights of all parties involved in the futures trading and the social public interests, and to mitigate market risks. For example, if a national holiday of more than three consecutive days falls between the second last trading day, the last trading day, and one of the days in the delivery period of the contract, the Exchange may decide either to advance or to postpone the Last Trading Day and shall announce in advance.

Grades and Quality Specifications

Medium sour crude oil, of which the quality specifications are as follows: the API gravity is 32.0 degrees and sulfur content is 1.5% by weight. The deliverable grades and the premiums and discounts will be stipulated separately by the Exchange. The Exchange may adjust the deliverable grades and the premiums and discounts based on the market conditions.

The "crude oil" in this contract refers to the liquid hydrocarbons exploited directly from underground natural reservoir, or a mixture of its natural forms.

Designated Delivery Storage Facilities

Designated Delivery Storage Facilities will be designated and separately announced by the Exchange.

Deliverable Crude Streams, Grades, and Premiums/Discounts

In accordance with the *INE Crude Oil Futures Contract Specifications* and the *INE Delivery Rules*, INE has set the deliverable crude streams, grades, and premiums/discounts for the crude oil futures contract as follows:

Deliverable Crude Streams, Grades, and Premiums/Discounts for Crude Oil Futures

Nation	Deliverable Crudes	API Gravity	Sulfur (%)	Price Differential (Yuan / Barrel)
United Arab Emirates	Dubai	≥30	≤2.8	0
	Upper Zakum	≥33	≤2.0	0
	Murban	≥35	≤1.5	5
Sultanate of Oman	Oman	≥30	≤1.6	0
State of Qatar	Qatar Marine	≥31	≤2.2	0
Republic of Iraq	Basrah Light	≥28	≤3.5	-5
	Basrah Medium	≥26	≤4.0	-10
The Federative Republic of Brazil	Tupi	≥28	≤0.8	10
People's Republic of China	Shengli	≥24	≤1.0	-5

Note:
1.API gravity = (141.5 / SG (at 60 °F)) – 131.5; where specific gravity (SG) is determined according to ASTM D1298.
2.Sulfur content is determined according to ASTM D4294.
3.Basra Light with 28 ≤ API < 29 that is already stored in designated delivery storage facilities can still be used for physical delivery.

INE will closely monitor market developments for each deliverable crude stream and make timely adjustments to the deliverable crude streams, grades, and/or premiums/discounts accordingly.

Origins for Crude Futures Deliverable Grade

1.Dubai, UAE: Fateh Terminal;

2.Upper Zakum, UAE: Zirku Island;

3.Murban, UAE: Fujairah Terminal or Jebel Dhanna Terminal

4.Oman, The Sultanate of Oman: Mina Al Fahal;

5.Qatar Marine, Qatar: Halul Island;

6.Basrah Light, Iraq:Basrah Oil Terminal or SPM

7.Basrah Medium, Iraq:Basrah Oil Terminal or SPM

8.Tupi,Brazil: Angra Dos Reis, Port Acu, STS Santos, STS Sao Paolo, Sao Sebastian, and FPSO of Brazil, La Paloma of Uruguay, and other loading ports recognized by INE

9.Shengli, PRC: Dongming Oil Terminal of Sinopec Shengli Oilfield Company.

INE closely monitors key changes and market developments for each deliverable grade, and will adjust deliverable grades origination locations accordingly.

APPENDIX

Designated Delivery Storage Facilities and Designated Inspection Agencies for Crude Oil Futures Contract

Business Contacts Info of Designated Delivery Storage Facilities

No.	Storage Facilities	Depot	Storage Location	Approved Capacity (10,000 m^3)	Active Capacity			Contact	Telephone
					Nominal Volume		Working Volume		
					10,000 m^3	10,000 bbl	10,000 bbl		
1	Sinopec Petroleum Reserve Co., Ltd.	SPRC Caofeidian	Caofeidian Industrial Zone, Tangshan, Hebei	100	40	251.6	200	Hao Dong, Sun Chengchao	022-66335663 18633100828 022-66335560 13273558162
2		SPRC Rizhao	Lanshan North Port Area, Rizhao, Shandong	120	100	629	520	Han Chunyu, Shen Xueqiang	0633-7898809 18563312255 0633-7898105 18763319263
3		SPRC Zhoushan	Cezi Island, Zhoushan, Zhejiang	80	70	440.3	350	Wang Maoxiang, Jin Zhiyang	0580-8772789 17606810993 0580-8772719 17606810911
4		SPRC Zhanjiang	Xinggang Avenue, Lingang Industrial Zone, Zhanjiang, Guangdong	90	80	503.2	416	Yang Yong, Zhang Lingyu	0759-3483018 17676504777 0759-3483377 18933767657
5		SPRC Hainan	83 Bin Hai Avenue, Yang Pu Economic Development Zone, Hainan	100	60	377.4	300	Zhang Zhibin, Zhao Longdan	0898-28839616 18117766005 0898-28839610 18117759065
6	PetroChina Fuel Oil Co., Ltd.	PetroChina Zhanjiang	Operating Area 2, Zhanjiang Port, 1 Youyi Road , Xiashan District, Zhanjiang, Guangdong	70	50	314.5	311	Shi Jinming, Li Long	0759-2658098 15889832944 0759-2658113 13726907857
7	Sinochem-Xingzhong Oil Staging (Zhoushan) Co., Ltd.	Sinochem Xingzhong	Aoshan Island, Lincheng, Dinghai District, Zhoushan, Zhejiang	100	35	220.15	210.1	Xiao Bin, Wang Kaiwei	0580-2061786 13906807550 0580-2061858 18158599850

No.	Storage Facilities	Depot	Storage Location	Approved Capacity (10,000 m³)	Active Capacity			Contact	Telephone
					Nominal Volume		Working Volume		
					10,000 m³	10,000 bbl	10,000 bbl		
8	Dalian PetroChina International Warehousing & Transportation Co., Ltd.	PetroChina Dalian	Dalian PetroChina Bonded Depot, New Port, Dalian Bonded Zone, Dalian, Liaoning	145	145	912.05	829.5	Ma Lei, Ge Wenyuan	0411-87596138 13840975333 0411-82828891 13390533777
9		PetroChina Dalian Intl	Dalian PetroChina International Reserve Depot, New Port, Dalian Bonded Zone, Dalian, Liaoning	180	180	1132.2	1080		
10		PetroChina Guangxi Intl	Guangxi PetroChina International Reserve Depot, Qinzhou Bonded Area, Guangxi Zhuang Autonomous Region	20	20	125.8	120	Ma Lei, Ou Yangsheng	0411-87596138 13840975333 0771-5827163 13907878791
11	Shandong Port Group Co., Ltd.	Qingdao Port Shihua	Dongjiakou Depot Phase I, Qingdao, Shandong	40	40	251.6	239.2	Li Xiaoliang, Qi Huimin	0532-82988371 13468287604 0532-82988686 13573877705
12		Qingdao Port Mercuria	88 Gangrun Avenue, Dong Jiakou Port, Huangdao District, Qingdao, Shandong	100	40	251.6	239.2		
13	Yangshan Shengang International Oil Logistics Co., Ltd.	Yangshan Oil	Shenjiawan, Yangshan Deep-Water Port, Shanghai	30	20	125.8	126	Dong Wei, Mao Jingna	021-68405123 13788931707 021-20939060 13681981636
14	Dalian North Oil Petroleum Logistics Co.,Ltd.	North Pertroleum	Sha Tuozi, New Port, Dalian Bonded Zone, Dalian, Liaoning	40	10	62.9	54	Yu Peng, Liu Bin	0411-87596759 13604286166 0411-87596757 13654985370
15	Sinochem-Hongrun Oil Staging (Weifang) Co., Ltd.	Sinochem Hongrun	North of BoHai Street, West of HaiFeng Road, Production Industrial Zone Binhai Economic Developing District, Weifang, Shandong	500	300	1887	1800	Ren Chengyong, Jiang Yaoyao	0536-2095126 13573601666 0536-2095123 13563629060
16	Dading Petroleum Logistics Co., Ltd.	Dading Petroleum	496 Aoshan East Road, Lincheng Sub-District, Dinghai District, Zhoushan, Zhejiang Province	44	22	138.38	130	Ye Tao, Jin Wencheng	0580-8171134 13857217124 0580-8171170 15943921712

Notes:
1. The nominal volume in the active capacity is converted as: 1 cubic meter ≈ 6.29 bbl.
2. Sinochem-Hongrun Oil Staging (Weifang) Co., Ltd. has a premium of RMB3/bbl.

Business Contacts Info of Designated Inspection Agencies					
No.	Name of Designated Inspection Agency	Address	Contacts	Phone	Fax
1	China Certification & Inspection Group Inspection Co., Ltd.	17th floor, Sanyuan building, No.18, Xibahe Dongli, Chaoyang district, Beijing	Chen,Hong Gu,Chen	010-84603658 13801063685 010-84603548 13810060886	010-84603183
2	SGS-CSTC Standards Technical Services Co., Ltd.	16th floor, Century Yuhui building, No.73 Fucheng road, Haidian district, Beijing	Chen,Zhou Zhao,Qi	0574-89070154 13306678519 0755-26392411 13821643138	0574-87777875
3	Intertek Testing Services Shanghai, Co., Ltd.	North building T52-3-2, No. 1201, Guiqiao road, Jinqiao development zone, Pudong area, Shanghai	Guan,Lianjun Zhang,Jian	0574-87836578 13306668721 0532-58715778 13869863179	0574-87840759
4	Technical Center for Industrial Products and Raw Materials Inspection and Testing, Shanghai Entry-Exit Inspection and Quarantine Bureau	1208 Minsheng road, Pudong area, Shanghai	Zhang,Jidong Li,Chen	021-67120903 13918256560 021-38620750 13331978879	021-67120902

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