

## What are the uses of petroleum ether? How many kinds of petroleum ethers are there?

There are several uses of petroleum ether:

1. It is mainly used as solvent and oil extraction.
  2. Used as organic solvent and chromatographic analysis solvent; It is used as organic high-efficient solvent, pharmaceutical extractant, fine chemical synthesis assistant, etc; It can also be used in organic synthesis and chemical raw materials.
  3. It is used for organic synthesis and chemical raw materials, such as synthetic rubber, plastic, nylon monomer, synthetic detergent, pesticide, etc. it is also a good organic solvent. It is mainly used as a solvent, as a foaming agent for foamed plastics, and as an extractant for drugs and essence.
- Petroleum ether can be divided into three types according to the boiling points during preparation, which are 30-60 °C, 60-90 °C and 90-120 °C.

Petroleum ether 30-60 °C means that the initial boiling point of the distillate is not lower than 30 °C and the final boiling point is not higher than 60 °C. By analogy, 30-60 petroleum ether is the most volatile, 60-90 is the second, and 90-120 is relatively less volatile.

Product	Synonyms	Specifications	CAS No.	EINECS:	Applications
Petroleum Ether	Light Petroleum, Petroleum Spirits, Ligroin, Light Oil, P-tolylmagnesium Bromide, Magnesium, Bromo 4-methylphenyl, Solvent for Fats, Solvent for Resins, essential oils, Hydrocarbons	61-76°C	8032-32-4	232-453-7	laboratory solvents, solvent for extract of herbals, component in pharmaceutical manufacturing by helping to isolate beta-sitosterol, component of food additive E499, a thinner for varnish, paint and printing ink formulations, a glue remover



# Petroleum Ether, 61-76 °C

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## **Petroleum Ether: Everything You Need to Know**

There are many petroleum products on the market, some well-known and understood, like gasoline and vaseline. Others, like petroleum ether, are less common and can be confusing.

### **1 Petroleum Ether: Everything You Need to Know**

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After all, there are so many ways to use crude oil, and most people don't need all of them.

Learning about petroleum ether will help demystify this unusual, often mistaken, but an essential fractional mixture.

Whether you are working in a lab, going to school, or merely seeing the term online and wondering what petroleum ether is, this article explains everything you need to know.

From the basic chemical components to how it's made and used, you'll find all the information you need right here.

## **What Is Petroleum Ether?**

The components of petroleum are divided by their boiling point. Petroleum ether is one of these fractions and is made out of aliphatic hydrocarbons.

Specifically, it is the one that has a boiling point of 35 to 60 °C or 95 to 140 °F. The fractions are separated from one another by fractional distillation, which separates out the parts of the pure petroleum.

For more information on petroleum fractions and boiling points, check out this video from Tutor Vista, where they explain how and why petroleum is separated into four or five fractions by fractional distillation and what that means.

Another way to describe Petroleum ether would be to say it is a nonpolar solvent.

Petroleum ether is excellent for breaking down glue, rubber, wax, and a number of other substances that can be problematic to remove.

Although you don't often find it in homes, properly used petroleum ether could undoubtedly get rid of tape and sticker residue.

The problem is that it's so effective that it might also destroy varnish or other surfaces.

## How Is Petroleum Ether Made?

Petroleum ether is made through the fractional distillation of pure petroleum.

In general, the process involves heating and removing other fractionals from the unrefined original blackish 'stuff.'

In order to make this specialized mixture and other fractionals, you need to follow the steps below.

Take crude, unfiltered petroleum and place it inside a furnace. This machinery isn't like a home furnace but rather a sizeable superheated furnace where the crude oil runs through pipes.

Heat to 400°C or about 752 °F. This extreme temperature causes even the original compound's densest and most heat-resistant components to boil.

The heating process will cause the separation of the various fractionals. The most heat-resistant is bitumen, which is used in finishing roads.

Repeat as necessary, each time working with less of the fossil fuel as it becomes ever more separated or 'fractional.' The seven general categories of petroleum oil each break down further into more specific mixtures. Some, like petroleum ether, may need to be distilled up to seven times to remove any impurities or other petroleum-based inclusions.

Once complete, the mixture will resemble water or clear alcohol with no noticeable color or opacity.

The petroleum oil will separate into numerous different useful substances based on the various boiling points of each fractional when exposed to this process.

There are seven general categories of petroleum constituents: Liquefied Petroleum Gas (LPG), Petrol (Gasoline), Kerosene, Diesel, Lubricating Oil, Paraffin Wax, and Bitumen.

The fractionals are more specific subsets of these main groups, and petroleum ether falls at the top end of the Kerosene spectrum.

Still, despite its ready flammability, it is not the same as the yellowish lamp kerosene you might buy at the store.

## What Is the Structure of Petroleum Ether?

Petroleum ether is primarily made of aliphatic hydrocarbons. In its molecular form, it is a single H<sub>3</sub>C connected to two CH<sub>3</sub> that look like a Y with one long leg that zigzags. In its standard liquid form, this toxic chemical looks like water.

It is simply a clear, not particularly viscous liquid that is indistinguishable from other similar liquids upon visual inspection.

Below is a list of more useful facts about petroleum ether's appearance and structure.

## Properties of Petroleum Ether

**Alternate Names** 1,1-dimethyl butane, light ligroin, pet ether, pether, light petroleum

**Boiling Point** 35 to 60 °C or 95 to 140 °F

**Chemical Formula** C<sub>6</sub>H<sub>14</sub>

**Density** 0.60-0.75 g/mL

**Description** A clear, nonfluorescent, colorless, volatile liquid that evaporates quickly

**Formula Type** Mixture

**Freezing Point** -116 degrees °C or -176.8 °F

**Hazards** Flammable, harmful if ingested or inhaled in large quantities

**Molecular Weight** 86.178 (26 °C)

**Odor** The odor of liquid petroleum ether can naturally resemble gasoline, but without additives to make the scent stronger.

**Refractive index (n<sub>D</sub>)** 1.370

**Shelf Life** Approximately 12 months

**Solubility** Insoluble in water but soluble in ethanol

**Use** Nonpolar solvent

**Vapor Pressure** 31 kPa (20 °C)

## **What is a Nonpolar Solvent?**

A nonpolar solvent, in the simplest terms, is a liquid or solvent without any partial positive or negative charges.

The bonds between the atoms in a nonpolar solvent have similar electronegativities, which are beneficial for creating or avoiding specific reactions.

Differences in electronegativities are so minimal as to be negligible. These solvents do not have a dipole moment because there is no separation of charge.

## **When and How Do You Use Petroleum Ether?**

Petroleum ether has several practical applications. One of the most common ways people use this mixture is in the industrial manufacturing processes.

It is an especially important component in pharmaceutical manufacturing by helping to isolate beta-sitosterol, which is also a component of food additive E499.

The aerial parts of *ageratum conyzoids* in petroleum ether are also part of the process for isolating Stigmasterol which helps the physiology and structure of cell membranes in plants.

Another place petroleum ether is frequently found is in laboratories, where it is used chiefly as a nonpolar solvent. Not only can this mixture break down rubber, but it is also helpful as a solvent for varnish, waxes, oils, and fats.

Retinyl esters are maximally soluble in a nonpolar solvent like petroleum ether.

Additionally, it is helpful both in and out of a lab setting as a glue remover. Since this mixture degrades rapidly in water or soil and evaporates readily when left exposed to air, you must take reasonable precautions to avoid spills and other accidents.

## **Is Petroleum Ether the Same as Gasoline?**

Petroleum ether comes from the same source as gasoline but is not the same substance.

Crude oil or petroleum is the root of both gas, which is sometimes called petrol, and petroleum ether. However, they are different parts of the pure form.

Gasoline is used as fuel in internal combustion engines to create the power source.

Meanwhile, Petroleum ether is a solvent used in cleaning sticky messes. Burning petroleum ether is not an efficient or effective fuel source for modern cars, trucks, or other powered vehicles.

Gasoline has a 100 to 400 °F boiling point, much higher than petroleum ether. Similarly, gasoline freezes at a warmer temperature, around -100 °F, though gas with a higher level of octane will freeze at a higher temperature.

Petroleum ether stays liquid down to -116 °F, which might not seem like a significant distinction, but it means you can use this mixture longer in dangerously subfreezing conditions.

## **Where Can You Get Petroleum Ether?**

Some ethers are controlled substances. However, petroleum ether isn't a true ether. You can generally get this useful solvent anywhere you'd shop for laboratory and chemical compounds, such as laboratory chemical suppliers.

You can even order it from Junyuan Petroleum Group.

## **Why Is It Called Petroleum Ether?**

Petroleum ether gets its name from its source and evaporative qualities. The 'ether' part of the name is a direct reference to how quickly and easily this mixture dissolves into a gaseous form. It is not a true ether but rather a reference to the word's original meaning.

Ether comes from the Latin root aether meaning "the upper pure, bright air." It was a 19th-century scientific term for the mysterious 'fifth element' (no relation to the movie), which was said to make up all things and fill all spaces.

The petroleum part of petroleum ether is from its source, which is petroleum oil. In its natural state, petroleum oil comes from underground and is pumped out with massive machines.

Typically, petroleum is found in vast reservoirs that were once ancient oceans, then trapped for millions of years.

Petroleum or fossil fuel is the liquid remains of marine plants and animals (diatoms) that lived millions of years ago.

It's a common misconception that all fossil fuel comes from dinosaurs, but mostly it comes from sea life that existed before the dinosaurs evolved.

### **What Is an Ether and Why Isn't Petroleum Ether an Ether?**

Petroleum ether is not technically an ether. In this case, the term ether is only used symbolically to infer the substance's similarities and overall volatility and lightness. Technically, Petroleum ether is a mixture.

Scientifically a mixture is comprised of two or more compounds or elements that have not created a reaction and bonded together.

Bonded mixtures that have reacted are called compounds instead. Below is a quick explanation of what ether is in modern chemistry.

According to Britannica (<https://www.britannica.com/science/ether-chemical-compound>), an ether is, "...any of a class of organic compounds characterized by an oxygen atom bonded to two alkyl or aryl groups.

Ethers are similar in structure to alcohols, and both ethers and alcohols are similar in structure to water.

In an alcohol one hydrogen atom of water, the molecule is replaced by an alkyl group, whereas in an ether both hydrogen atoms are replaced by alkyl or aryl groups.

At room temperature, ethers are pleasant-smelling colorless liquids."

### **Important Facts to Know About Petroleum Ether**

[Hexane](#) is a more potent 'cousin' of petroleum ether, meaning it is more challenging to work with and more effective in some cases.

So, for example, you might damage the surface of a rubber wheel with petroleum ether, but you'd be more likely to eat a hole in it using hexane.

Here are a few more fast facts to know about petroleum ether.

Petroleum ether is also sometimes confused with naphtha or kerosene. However, kerosene is heavier, and naphtha is lighter than petroleum ether. A few other commonly mistaken petroleum products which are not petroleum ether include X4, kerosene, and hexane.

Diethyl ether is also commonly mistaken for petroleum ether. However, Diethyl ether is a naturally occurring organic chemical.

According to Chem Libretexts ([https://chem.libretexts.org/Courses/Sacramento\\_City\\_College/SCC%3A\\_CHEM\\_330\\_-\\_Adventures\\_in\\_Chemistry\\_\(Alviar-Agnew\)/09%3A\\_Organic\\_Chemistry/9.02%3A\\_Aliphatic\\_Hydrocarbons#:~:text=,Aliphatic%20hydrocarbons%20are%20hydrocarbons%20based%20on%20chains%20of%20C](https://chem.libretexts.org/Courses/Sacramento_City_College/SCC%3A_CHEM_330_-_Adventures_in_Chemistry_(Alviar-Agnew)/09%3A_Organic_Chemistry/9.02%3A_Aliphatic_Hydrocarbons#:~:text=,Aliphatic%20hydrocarbons%20are%20hydrocarbons%20based%20on%20chains%20of%20C)

atoms," and the three types of aliphatic hydrocarbons are, "...Alkanes are aliphatic hydrocarbons with only single covalent bonds. Alkenes are hydrocarbons that contain at least one C–C double bond, and alkynes are hydrocarbons that contain a C–C triple bond."

Petroleum ether is an animal carcinogen. Please handle with care and always wear appropriate protective gear, including gloves, eye protection, and a mask.

Petroleum ether is only one part of the original substance as it is pumped from the ground. Pure petroleum is also known as crude oil. However, without the fractional distillation process, all the parts of petroleum would remain combined and in their natural state. The crude oil mixture is different volatile liquid hydrocarbons made of mostly hydrogen and carbon that may also contain smaller amounts of oxygen, nitrogen, and sulfur.

Some substances have no substitute. However, in many cases, you can use hexane in place of petroleum ether. The petroleum ether is a weaker nonpolar solvent, making it more effective when trying to minimize the risk and potential damage.

Petroleum ether can be called petroleum spirit, but not all petroleum spirits are necessarily petroleum ether. Since 'petroleum spirit' is an umbrella term, it can also apply to other fractionals with similar boiling points, such as benzene. Petroleum benzene is very similar. However, benzene has aromatic hydrocarbons in addition to the aliphatic hydrocarbons, and petroleum ether does not.

### **Final Thoughts**

Petroleum ether is a nonpolar solvent made of aliphatic hydrocarbons that is common in laboratories and industrial settings.

This highly flammable liquid comes from crude oil, but as a fractional, it is only one small part of the many components of petroleum. In its liquid state, petroleum ether is clear. Petroleum ether is a milder, less effective relative of hexane.

However, it is commonly mistaken for several other petroleum products with very different functions. Typically, this mixture is used as a solvent for glue, wax, rubber, oils, or fats, and it is essential in pharmaceutical manufacturing.

tags: Light Petroleum, Petroleum Spirits, Ligroin, Light Oil, P-tolylmagnesium Bromide, Magnesium, Bromo 4-methylphenyl, Solvent for Fats, Solvent for Resins, essential oils, Hydrocarbons, Hexane, Normal Hexane