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Turpentine

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For other uses, see [Turpentine \(disambiguation\)](#).

Turpentine (also called **spirit of turpentine**, **oil of turpentine**, **wood turpentine** and colloquially **turps**^[3]) is a fluid obtained by the [distillation](#) of [resin](#) from live trees, mainly [pines](#). It is mainly used as a [solvent](#) and as a source of materials for organic synthesis.

Turpentine is composed of [terpenes](#), mainly the monoterpenes [alpha-pinene](#) and [beta-pinene](#) with lesser amounts of [carene](#), [camphene](#), [dipentene](#), and [terpinolene](#).^[4]

The word *turpentine* derives (via [French](#) and [Latin](#)) from the Greek word τερεβινθίνη *terebinthine*, the feminine form (to go with the feminine Greek word for resin) of an adjective τερεβινθινος derived from the Greek noun τερέβινθος, the name for a species of tree, the [terebinth](#) tree.^[5] [Mineral turpentine](#) or other petroleum distillates are used to replace turpentine, but they are very different chemically.^[6]

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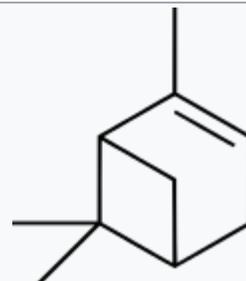
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Source trees [[edit](#)]

One of the earliest sources was the [terebinth](#) or turpentine tree (*Pistacia terebinthus*), a [Mediterranean](#) tree related to the [pistachio](#). Important pines for turpentine production include: [maritime pine](#) (*Pinus pinaster*), [Aleppo pine](#) (*Pinus halepensis*), [Masson's pine](#) (*Pinus massoniana*), [Sumatran pine](#) (*Pinus merkusii*), [longleaf pine](#) (*Pinus palustris*), [loblolly pine](#) (*Pinus taeda*) and [ponderosa pine](#) (*Pinus ponderosa*).

[Canada balsam](#), also called Canada turpentine or balsam of [fir](#), is a turpentine which is made from the [oleoresin](#) of the [balsam fir](#). Venice

Turpentine



Chemical structure of pinene, a major component of turpentine

Identifiers	
CAS Number	9005-90-7
ECHA InfoCard	100.029.704
EC Number	232-688-5
UNII	XJ6RUH004G
Properties	
Appearance	Viscous liquid ^[1]
Odor	Resinous ^[1]
Hazards	
GHS pictograms	
	^[2]
GHS signal word	Danger
Except where otherwise noted, data are given for materials in their standard state (at 25 °C [77 °F], 100 kPa).	
Infobox references	



A 1912 postcard depicting

turpentine is produced from the [western larch](#) *Larix occidentalis*.

To tap into the sap producing layers of the tree, turpentiners used a combination of hacks to remove the pine bark. Once debarked, pine trees secrete oleoresin onto the surface of the wound as a protective measure to seal the opening, resist exposure to micro-organisms and insects, and prevent vital sap loss. Turpentiners wounded trees in V-shaped streaks down the length of the trunks to channel the oleoresin into containers. It was then collected and processed into spirits of turpentine. Oleoresin yield may be increased by as much as 40% by applying [paraquat](#) herbicides to the exposed wood.^[7]

The V-shaped cuts are called "catfaces" for their resemblance to a cat's whiskers. These marks on a pine tree signify it was used to collect resin for turpentine production.^[8]

Converting oleoresin to turpentine ^[edit]

Crude [oleoresin](#) collected from wounded trees may be evaporated by [steam distillation](#) in a [copper](#) still. Molten [rosin](#) remains in the still bottoms after turpentine has been evaporated and recovered from a [condenser](#).^[7] Turpentine may alternatively be condensed from [destructive distillation](#) of pine wood.^[4]

Oleoresin may also be extracted from shredded pine stumps, roots, and slash using the light end of the heavy [naphtha](#) fraction (boiling between 90 and 115 °C or 195 and 240 °F) from a crude [oil refinery](#). Multi-stage counter-current [extraction](#) is commonly used so fresh naphtha first contacts wood leached in previous stages and naphtha laden with turpentine from previous stages contacts fresh wood before [vacuum distillation](#) to recover naphtha from the turpentine. Leached wood is steamed for additional naphtha recovery prior to burning for [energy recovery](#).^[9]

When producing chemical [wood pulp](#) from [pines](#) or other [coniferous trees](#), sulfate turpentine may be condensed from the gas generated in [Kraft process](#) pulp [digesters](#). The average yield of crude sulfate turpentine is 5–10 kg/t pulp.^[10] Unless burned at the mill for energy production, sulfate turpentine may require additional treatment measures to remove traces of [sulfur](#) compounds.^[11]

Industrial and other end uses ^[edit]

Solvent ^[edit]

The two primary uses of turpentine in industry are as a [solvent](#) and as a source of materials for [organic synthesis](#). As a solvent, turpentine is used for thinning oil-based [paints](#), for producing [varnishes](#), and as a raw material for the chemical industry. Its industrial use as a solvent in industrialized nations has largely been replaced by the much cheaper [turpentine substitutes](#) distilled from [crude oil](#). Turpentine has long been used as a solvent, mixed with [beeswax](#) or with [carnauba wax](#), to make fine furniture wax for use as a protective coating over oiled wood finishes (e.g., [tung oil](#)).

Source of organic compounds ^[edit]

Turpentine is also used as a source of raw materials in the synthesis of fragrant chemical compounds. Commercially used [camphor](#), [linalool](#), [alpha-terpineol](#), and [geraniol](#) are all usually produced from [alpha-](#)

harvesting pine resin for the turpentine industry



"[Herty system](#)" in use on turpentine trees in Northern Florida, circa 1936



Chipping a turpentine tree in Georgia (US), circa 1906-20

pinene and **beta-pinene**, which are two of the chief chemical components of turpentine. These pinenes are separated and purified by distillation. The mixture of **diterpenes** and **triterpenes** that is left as residue after turpentine distillation is sold as **rosin**.

Medicinal elixir [edit]

Turpentine and petroleum distillates such as **coal oil** and kerosene have been used medicinally since ancient times, as topical and sometimes internal home remedies. Topically, it has been used for abrasions and wounds, as a treatment for **lice**, and when mixed with **animal fat** it has been used as a chest rub, or inhaler for nasal and throat ailments.^[*citation needed*] Many modern **chest rubs**, such as the **Vicks** variety, still contain turpentine in their formulations.

Turpentine was a common medicine among seamen during the **Age of Discovery**. It is one of several products carried aboard **Ferdinand Magellan**'s fleet in his **first circumnavigation of the globe**.^[12] Taken internally it was used as a treatment for **intestinal parasites**, but because of its toxicity, it should never be taken internally.^[13]^[14]

Niche uses [edit]

- Turpentine is also added to many cleaning and sanitary products due to its antiseptic properties and its "clean scent."
- In early 19th-century America, turpentine was sometimes burned in lamps as a cheap alternative to **whale oil**. It was most commonly used for outdoor lighting, due to its strong odour.^[15] A blend of **ethanol** and turpentine called **camphine** served as the dominant lamp fuel replacing **whale oil** until the arrival of kerosene.^[16]
- In 1946, **Soichiro Honda** fueled the first Honda **motorcycles** with turpentine, due to the scarcity of gasoline in Japan following **World War II**.^[17]
- In his Book **If Only They Could Talk**, vet and author **James Herriot** describes the use of its reaction with resublimated iodine to "drive the iodine into the tissue" - or perhaps just impress the watching customer with a spectacular treatment.^[18]
- Turpentine was added extensively into gin during the **Gin Craze**.^[19]

Hazards [edit]

As an **organic** solvent, its vapour can irritate the skin and eyes, damage the **lungs** and respiratory system, as well as the **central nervous system** when inhaled, and cause damage to the **renal system** when ingested, among other things.^[20] Being combustible, it also poses a fire hazard. Ingestion can cause burning sensations, abdominal pain, nausea, vomiting, confusion, convulsions, diarrhea, and unconsciousness.^[21] Because turpentine can cause spasms of the airways particularly in people with asthma and whooping cough, it can contribute to a worsening of breathing issues in persons with these diseases if inhaled.



People can be exposed to turpentine in the workplace by breathing it in, skin absorption, swallowing it, and eye contact. The **Occupational Safety and Health Administration** (OSHA) has set the legal limit (**permissible exposure limit**) for turpentine exposure in the workplace as 100 ppm (560 mg/m³) over an 8-hour workday. The **National Institute for Occupational Safety and Health** (NIOSH) has set a **recommended exposure limit** (REL) of 100 ppm (560 mg/m³) over an 8-hour workday. At levels of 800 ppm, turpentine is **immediately dangerous to life and health**.^[22]

See also [edit]

- [Charles Herty](#)
- [Galipot](#)
- [Naval stores industry](#)
- [Patent medicine](#)
- [Retsina](#)
- [Russia leather](#), a water-resistant leather, using a birch oil distillate similar to turpentine in its manufacture.

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External links [[edit](#)]

- [Inchem.org](#) , [IPCS](#) INCHEM Turpentine classification, hazard, and property table.
- [CDC - NIOSH Pocket Guide to Chemical Hazards - Turpentine](#)
- [FAO.org](#) , Gum naval stores: Turpentine and rosin from pine resin
- [FloridaMemory.com](#) , Florida State Archive photographs of turpentine camps and laborers



Wikimedia Commons has media related to [Turpentine](#).

[Wikisource](#) has the text

- [HCHSonline.org](#), Timber and Turpentine Industries
- [Distil my beating heart](#)
- [Florida's "Turpentine" Camps](#)
- [Turpentine Industry](#) at [A History of Central Florida Podcast](#)



of the 1879 *American Cyclopædia* article *Turpentine*.

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