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Terminology Relating to Naval Stores, Including Tall Oil and Related Products¹

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1. Scope

1.1 Although the naval stores industry has been a continuing producer of chemical products for many centuries, the nature of the industry, its products, and its terminology have changed. In particular, the original practice of recovering naval stores through the processing of the exudate from pine trees (gum naval stores) has been supplemented by their extraction by solvent (wood naval stores) and by wood pulping chemicals (sulfate naval stores). Thus, this terminology contains some old terms now mostly of historic value, together with the terms of the modern naval stores industry².

2. Terminology

abietic acid, commercial grade, *n*—a product consisting chiefly of rosin acids in substantially pure form, separated either from rosin or tall oil commercially for specific purposes and in which abietic acid and its isomers are the principal components.

colophony, *n*—a term denoting medium and high grades of rosin.

crude stripper oil, *n*—a by-product of the manufacture of citrus juice, composed largely of d-limonene and containing up to 1.5 % of aldehydes. (See also **d-limonene**.)

dipentene, *n*—chemically defined as the optically inactive form of the monocyclic terpene hydrocarbon limonene.

DISCUSSION—Commercial dipentenes contain substantial portions of other monocyclic and bicyclic, as well as some oxygenated, terpenes having closely related boiling ranges. They are generally obtained by fractional distillation from crude oils recovered in the several commercial methods of utilizing pine wood, also by isomerization during the chemical processing of terpenes. There is no legal requirement under the Naval Stores Act that the source, origin, or kind of dipentene be shown in the commercial designation. Consequently, coined trade names are sometimes used in selling this product. The four kinds of commercial dipentene are:

chemically processed dipentene, n—recovered as a product or a by-product in connection with the chemical treatment

and conversion of other terpenes.

destructively distilled dipentene, n—from the lighter portions of the oil recovered during the destructive distillation of pine wood.

steam-distilled dipentene, n—fractionated from the crude oleoresinous extract during the processing of related steam-distilled wood naval stores.

sulfate dipentene, n—from the crude condensate of the vapors generated in the digestion of wood in the sulfate paper pulp process.

ester gum, *n*—a resin made from rosin and a polyhydric alcohol, generally glycerol or pentaerythritol.

gloss oil, *n*—a solution of limed rosin or limed rosin acids in a volatile solvent, used chiefly in surface coatings. (When made from tall oil, the source is usually indicated.)

gum thus, *n*—botanically, the oleoresin from trees of *Boswellia* species native to Arabia and Somaliland.

DISCUSSION—Also known as olibanum or frankincense. As applied to the naval stores industry, the term refers to the crystallized pine oleoresin or “scrape” collected from scarified “faces” of trees being worked for turpentine.

d-limonene, *n*—a purified optically active terpene hydrocarbon recovered from by-products of the citrus industry.

DISCUSSION—It is used as a chemical intermediate and as a monomer in terpene resins.

metallic resinates, *n*—rosin in which part or all of the rosin acids have been chemically reacted with those metals that give soaps or salts which are water insoluble.

DISCUSSION—Limed rosin, zinc-treated rosin, and the resinates of lead, cobalt, copper, and manganese, are of the greatest industrial importance.

modified rosin, *n*—rosin that has been treated with heat or catalysts, or both with or without added chemical substances, so as to cause substantial change in the structure of the rosin acids, as isomerization, hydrogenation, dehydrogenation, or polymerization, without substantial effect on the carboxyl group.

DISCUSSION—The following are types of modified rosin:
disproportionated (dehydrogenated) rosin, n—rosin that has been subjected to chemical or physical treatment, or both, so as to cause substantial simultaneous hydrogenation and dehydrogenation of the

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² Zinkel, D. F., and Russell, J., eds., *Naval Stores: Production, Chemistry and Utilization*, Pulp Chemicals Association, NY, 1989.

rosin acids to form their hydrogenated and dehydrogenated counterparts.

heat-treated rosin, n—rosin in which a reduction of acid number and a positive shift in optical rotation has been brought about by controlled heat treatment only, in order to improve its suitability for specific uses.
hydrogenated rosin, n—rosin that has been treated with hydrogen under conditions that cause a partial or complete saturation of the rosin acids present, best indicated by a drop in the refractive index. Commercial hydrogenated rosin is usually only partially saturated.

polymerized rosin, n—rosin that has been treated by chemical or physical means, or both, in a manner so as to cause a union of a part of the rosin acids to form dimers to such an extent that the average molecular weight of such rosin will be measurably greater than that of the original rosin. Also known as “dimered resin.”

monocyclic terpenes, n—a designation sometimes used in the trade to describe a heterogeneous mixture of monocyclic, bicyclic, and other related terpene C₁₀H₁₆ hydrocarbons recovered or removed in the fractionation of certain terpenes or other essential oils, or as a by-product in the chemical conversion of pinenes generally sold under trade names.

DISCUSSION—The term “other monocyclic hydrocarbons,” used in statistical reports of the U.S. Department of Agriculture, covers this type of material.

naval stores, n—chemically reactive oils, resins, tars, and pitches derived from the oleoresin contained in, exuded by, or extracted from wood chiefly of the pine species (*Genus Pinus*).

neutral content, n—the total amount of material contained in naval stores, such as rosin, tall oil, and their derivatives that do not contain any acidic functionality.

DISCUSSION—Neutral content includes unsaponifiable matter and any combined acidic material present as derivatives, such as esters, anhydrides, or lactones.

oil of (pine) tar, n—certain heavier fractions of the volatile oil recovered by distilling pine-tar oil to convert it into pine tar.

oil of turpentine, n—the pharmaceutical name for spirits of turpentine that conforms to the requirements of the National Formulary.

oleoresin, n—pine gum, the nonaqueous secretion of resin acids dissolved in a terpene hydrocarbon oil that is produced or exuded from the intercellular resin ducts of a living tree, and is present, together with oxidation products, in the dead wood of weathered limbs and stumps.

pine needle oil, n—an essential oil of typical fragrance obtained by steam distillation of the leaves (needles) of certain species of pine.

DISCUSSION—Some imported oils derived from other conifers are classified as pine needle oil.

pinenes, n—bicyclic terpene hydrocarbons, the principal constituent of all turpentines and existing therein in two isomeric forms, alpha-pinene and beta-pinene.

pine oil, n—a colorless to amber colored volatile oil with characteristic pinaceous odor, consisting principally of isomeric tertiary and secondary cyclic terpene alcohols, with

variable quantities of terpene hydrocarbons, ethers, ketones, phenols, and phenolic ethers, the amount and character of which depend on the source and method of manufacture.

DISCUSSION—The four commercial kinds of pine oil are:
destructively distilled pine oil, n—obtained from the lighter distillate from the destructive distillation (carbonization) of pine wood.
steam-distilled pine oil, n—obtained from the crude oleoresinous extract of pinewood during the processing of related steam-distilled wood naval stores.
sulfate pine oil, n—a high boiling fraction obtained in the refining and fractional distillation of crude sulfate turpentine.
synthetic pine oil, n—obtained by chemical hydration of pinenes to form monocyclic terpene alcohols, mainly alpha-terpineol.

pine tar, n—A product of the destructive distillation of pine wood.

DISCUSSION—There are several types of pine tar as follows:

kiln burned, pine tar, n—the heavy, oily liquid resulting from controlled carbonization (slow burning) of pine knots and stump-wood to charcoal in earth-covered piles or “kilns,” with introduction of insufficient air to permit complete combustion; contains undecomposed resin acids along with the decomposition products. This product is sometimes called “country tar.”

pine tar oil, n—the oil obtained by condensing the vapors from the retorts in which resinous pine wood is destructively distilled (carbonized).

retort, pine tar, n—the tar produced by removal of volatile oils from pine tar oil by steam distillation. Several grades are marketed, namely: Thin, Medium, Heavy, and Extra Heavy, so classified on the basis of viscosity, and depending upon the quantity of volatile oils removed.

Stockholm, pine tar, n—kiln-burned pine tar produced in Scandinavian countries from wood of the Northern European pine, *Pinus sylvestris*.

pitch—a term to describe a variety of solid or semi solid products isolated from trees as follows:

Archangel pitch, n—originally a genuine pine pitch made from pine tar in the Archangel district of Russia; in this country a similar product is made from residues of pine origin blended with various oils to make a pitch for caulking boats.

Brewer’s pitch, n—a term used to designate a type of pitch made by blending certain oils, waxes or other ingredients with rosin for the coating of beer barrels.

Burgundy pitch, n—originally the solidified resin obtained by heating and straining the air-dried solid oleoresin exuded by the Norway spruce (*Picea excelsa*) and European silver fir (*Abies pectinata*); now denotes an artificial mixture made by heating rosin with certain fixed oils, the combination being used for adhesive plasters.

Navy pitch, n—a pitch obtained by melting rosin with pine tar, with or without rosin distillation residues. The terms Archangel pitch, Brewer’s pitch, Burgundy pitch, and Navy pitch have been in use in the naval stores industry for many