

## 60300 – 60310 Colophony or Common Resin

*(from "Pitman's Common Commodities and Industries, GUMS & RESINS – by Ernest J. Parry, London; Printed by Sir Isaac Pitman & Sons, Ltd, Bath, England, v-(1465E))*

This resin is the cheapest of all commercial resins, and is more largely employed than any other. At present the principal source of supply is the United States, but considerable quantities are collected in France and Russia, and recent researchers and developments indicate that there are vast possibilities for the industry in India.

Colophony is the non-volatile portion of the oleo-resinous exudation of various species of pine trees, which are to be found in enormous quantities in the producing regions. This oleoresinous exudation is known as crude turpentine, which, on steam distillation yields the oil of turpentine of commerce, leaving the rosin behind. Common rosin, or colophony, is used for numerous purposes in the arts, including the manufacture of very low grade varnishes, cheap household soaps, for the distillation of rosin spirit and rosin oil, and for the manufacture of metallic resonates, which are added to varnishes to assist rapid drying. Varnish made from colophony is of very low grade and weathers very badly: indeed, powdered rosin can usually be scratched with the finger from the varnished article. A small, but very important technical use for colophony has quite recently arisen in the manufacture of ester gums, as they are called. The colophony, being almost entirely of an acid nature, combines with the alcohol glycerine, and with certain other bodies containing hydroxyl groups, forming a stable ester, or salt of the acid body present. These "ester gums" have been found to be far more useful than ordinary colophony for varnish manufacture, as the dried varnish weathers well, and cannot be scratched or removed with anything like the ease that colophony varnish can. To indicate the value of the rosin industry, we may draw attention to the imports of the year 1907 into the United Kingdom, when rosin to the value of £ 896,301 was brought into the country, of which no less than £ 693,065 came from the United States, and £ 136,092 from France.

The methods by which rosin is obtained from the pine tree vary to a certain extent, but the following description will fairly indicate the general principles underlying its production. In the United States the principal tree used for turpentine-tapping is *Pinus Australis*, but numerous other pines are also employed to a less extent. In the autumn and winter the trees are "boxed", that is, excavations of characteristic shape are made in the trunks of the trees, about 8 in. above the ground. these excavations are known as boxes and are so made as to hold from 5 to 10 lb. of the exudation. After allowing a few days after the boxing, the bark is cut away for about 3 ft. above the box and the wood is cut with grooves leading to the box so that the oleoresin shall collect there and not run away. The exudation of the crude turpentine commences about the following March and goes on till the end of August when it becomes very slow, and then finishes about the middle of October. The crude oleoresin is then baled out into barrels and conveyed to the stills and heated to drive off water. It is then distilled, and the volatile essential oil sold as oil of turpentine, and the non-volatile colophony or rosin is left in the still. As a rule, the "tapping" life of these trees is from five to eight years, after which they yield but little exudation.

In France the turpentine and rosin industry is practically confined to the Landes district and the principal tree used is *Pinus pinaster*. The crude oleoresin, known in France as the "gemme", exudes from the trees during the warm season, from March to October, from an incision made by the collector with an axe. This incision is known as the "carre", and is kept open by the removal of a thin slice once a week, and is gradually extended to a height of about 12 ft. from the ground. The tree is worked for one year and then left alone for two or three years, when a fresh incision is made, and the tree, by this means will yield oleoresin in payable quantity for a period of about forty years. It is then "bled to death", that is, worked by means of several incisions simultaneously, and so quite exhausted, before it is handed over to the tree fellers.

The Indian pine tree, which is known locally as "chir", is the *Pinus longifolia*, and the method of collecting the oleoresin is based on that in vogue in France. An initial cut, about 6 in. by 4 in. and 1 in. deep is cut near the base of the tree, and slightly extended every week throughout the summer, until it is about 18 in. long by the end of the year. The oleoresin collects in a cup fixed at the base of this cut or "blaze", as it is called, and contents are emptied periodically. Two classes of tapping are in use, (1) light tapping, and (2) heavy tapping. The latter system is carried out in the case of all trees due to be felled within five years, and consists in making as many blazes as possible, so that the tree is, as in the case of the French trees, bled to death, before being handed over to the feller.

Turpentine is also made to a large extent in Russia, but it is a different product to the above and the rosin industry is of much less importance.

At the present moment American and French rosins are the two commercial varieties, hardly any other ever being seen on the London market. French rosin is usually known as galipot, and American grades are lettered, for example A is nearly black, and W.W. is almost colourless ("water white").

Colophony consists almost entirely of a free acid, or mixture of free acids, known as abietic acid, possibly in the form of an anhydride, which is known chemically as a lactone. A small quantity of esters also exists, but considerably smaller than that found in most other resins. A good quality colophony is of a pale yellow colour, soft, easy to fracture with the fingers and practically transparent. On warming a distinct terebinethinate odour is noticeable. It is easily soluble in alcohol or in acetic acid, and in volatile and fixed oils. It is slightly heavier than water, its specific gravity being from 1.0450 to 1.085. It softens at about 75°C, and is completely melted at 120°C to 135°C. Being the cheapest resin of commerce, colophony is never adulterated. The analytical figures of typical colophony are as follows:

Specific gravity	=	1.450 to 1.085
Acid value	=	150 to 175
Ester value	=	7 to 20
Iodine value	=	118 to 128
Unsaponifiable matter	=	4 to 9%

A useful quantitative test for colophony is the reaction known as the Storch-Morawski reaction. If a fragment of colophony be dissolved in acetic anhydride and the mixture allowed to cool, and the liquid filtered, the latter yields a fine reddish-violet coloration when sulphuric acid of specific gravity 1.53 is allowed to flow gently down the tube containing the acetic solution. The colour appears at the junction layer of the two liquids.

The so-called "driers" of the paint trade are prepared by melting colophony with the oxide of the metal, usually lead or manganese, or by the addition of a solution of a suitable metallic salt to an aqueous solution of the colophony in the form of its sodium salt. These resinat driers always contain a large excess of resin, as otherwise their action would be far too powerful for general use. To be satisfactory, the resinat driers must be completely soluble in linseed oil, and any insoluble metallic oxide is quite useless.

On dry distillation colophony yields the commercial products known as rosin spirit and rosin oil. The process is carried out in vertical cast-iron stills. On distillation gas and aqueous liquid are first driven off, and then follows a light, oily liquid, which boils between 80°C and 250°C, and, when purified is known as rosin spirit. At about 290°C to 310°C rosin oil commences to distil over. The residue in the still consists of valuable pitch or of cokey matter, according to the length to which the distillation has gone. Rosin spirit is a pale or colourless oil of specific gravity about 0,850 to 0.880, and has been used to some extent as a substitute for turpentine.

Rosin oil is a viscid liquid varying in colour from a very pale yellow to dark brown. It is usually strongly fluorescent, but the "bloom", as it is called, can be removed by suitable treatment with dinitronaphthalene. Rosin oil has a specific gravity varying from 0.980 to 1.100, and consists principally of hydrocarbons with a small quantity of resin acids. It has a large use in the lubrication of machinery and wagon wheels, and when mixed with lime and petroleum oils form the axlegrease of commerce. It is also used, with or without linseed oil in the manufacture of printer's ink.

## 60300 Colophony Resin

From different kinds of pine trees. Colophony resin is the anhydrous distillation residue of the turpentine gained from different pine trees, especially from P. Laricio, P. Pinaster, P. australis, P. Taeda, ect..

### Specification

Softening Point (Ring + Kugel)	71 - 82°C
Density:	1.06 – 1.09 g/cm <sup>3</sup>
Acid number:	162 - 178 mg KOH/g
Saponification value:	160 - 180 mg/g
Unsaponifiable matter:	max. 7 %
Volatile component:	max. 2.4 %

### FDA-Status:

Colophony resin is listed under the following Section Numbers according to the Code of Federal Regulations (CFR) of the FDA (Food and Drug Administration) Title 21 (Chapter I):

175.105	Adhesives
175.300	Resinous and polymeric coatings
176.170	Components of paper and paperboard in contact with aqueous and fatty foods
176.180	Components of paper and paperboard in contact with dry food
176.200	Defoaming agents used in coatings
176.210	Defoaming agents used in the manufacture of paper and paperboard
177.1200	Cellophane
177.1210	Closures with scaling gaskets for good containers
177.2600	Rubber articles intended for repeated use

**CAS-No.:** 8050-09-7 (also valid for TSCA and ACOIN-Lists)

**EINECS-No.:** 2324757

## 60303 Colophony Rosin, extra dark

The Colophony extra dark contains more ethereal oils and coloring components than the light colophonies. The dark rosin is especially suitable for the production of violin-varnish-rosins. The procurement of the dark rosin is very difficult, because nowadays the light rosin is cheaper than the dark one and therefore there is no real market for the dark rosin

## 60310 Colophony Rosin, Powder