

Naval Stores Inspection and Grading Service

U. S. DEPARTMENT OF AGRICULTURE, PRODUCTION AND MARKETING ADMINISTRATION
TOBACCO BRANCH, NAVAL STORES DIVISION

The term naval stores is a misnomer. Its usage antedates the founding of the American colonies. It originated from the use of tar and pitch from coniferous trees on British naval and other wooden sailing vessels for caulking decks and sides and preserving rigging. American naval stores production began in early Colonial days. "Hard Pitche", "Tarre", "Turpentyne" and "Rozen" are mentioned in an English document dated 1610. "Turpentyne" referred to the crude gum collected from pine trees.

Today, "naval stores" are derived from several sources: (1) pine gum extracted from living trees; (2) extraction by solvents from and steam distillation of pine stump wood; (3) destructive distillation of similar wood; and (4) refining waste by-products of the alkaline paper pulp industry. The term includes turpentine and rosin (the primary derivatives), pinene, pine oil, dipentene, rosin oil, and tall oil.

Turpentine is primarily used as a solvent and is an important chemical raw material in many end products. Rosin end uses include pro-

TECTIVE COATINGS, SOAP, PAPER SIZE, ADHESIVES, SURGICAL TAPE, PRINTING INK, MATCHES, FLOOR COVERINGS, SYNTHETIC RUBBER AND PLASTICS.

Of the many naval stores, turpentine and rosin are sold on the basis of inspection and grade certification. Rosin grades relate primarily to color. Cleanliness, brightness and freedom from foreign matter are prime considerations. Three attributes of color determine the grade hue, purity and brightness. Color is important because it is the differentiating factor in most end uses.

Inspection of tar, pitch, and turpentine began in Georgia in 1766. Inspection under recognized standards did not begin until 1846 under rules of the New York Produce Exchange, although the first copper stills and condensers appeared in New York in 1834. New York then was the leading processing and exporting market. Much of the pine gum was shipped there from the South for distillation. There were then several recognized grades for crude gum (called dip). Turpentine was sold under six color grades to

CLASSIFY THE DEGREES OF DETERIORATION resulting from careless handling following distillation.

Prior to 1846 there were two grades of rosin: "fine" and "common". Improved distillation resulted in better rosin. This permitted closer color differentiation and increased the color range. Thus, color became the primary factor early in the marketing system, as it is today. The initial color grade designations were: A (Amber), R (Red), and B (Black). Continued improvement in distillation, handling and straining resulted in the addition of the grades: "Extra Amber," "Extra Red," "Extra Common" and "Extra Black."

With the advent of greater selectivity, accompanied by expanding higher qualities and uses, the demand for improved grading techniques was a natural development. Thus, the New York Produce Exchange and the Board of Trade of Wilmington, North Carolina (another leading Southern naval stores market) employed a New York inspector to prepare improved grad-

Continued on Page Thirteen

Continued from Page Twelve

ing standards. These were made of hand-cut cubes of rosin, exactly 7/8 inch in dimension, from rosin representing a uniform gradation from the lightest to the darkest color. Duplicates of these original standards were made and sold in sets of 10 each as "rosin type samples". These were the first generally accepted grade standards.

During 1860-1915 four additional lighter grades were added and one dark grade abolished, resulting in 13 grades, each alphabetically denominated.

The Naval Stores Act (7 U. S. C. 94) prescribes the use of these grades in selling rosin in interstate commerce. Most of the grades have been assigned names to prevent errors in calling grades during inspection operations. (There is no factual basis for statements that these names represented children residing on Southern plantations). These follow:

H	Harry	No. 1
G	George	Low No. 1
F	Frank	Good No. 2
E	Edward	No. 2
D	Dolly	Good Strained
B	Betsy	Common Strained

In 1887, Georgia enacted a naval stores inspection law authorizing the appointment of inspectors by governments of seaport towns, and by the Courts of Ordinary in inland counties. Florida passed a similar statute in 1915, providing for the appointment by the Governor of state inspectors, including a Supervising Inspector. No such legislation was enacted in the other producing states of Alabama, Mississippi, Louisiana, South Carolina and Texas.

The Congress in 1912 included in the Agricultural Appropriation Act funds for the study of inspection and development of better naval stores standards. Later, appropriations were made for the development of permanent glass standards for rosin, which were offered to and accepted by the trade in 1917. The lack of uniform, accurate and reliable inspection and grading practices, however, continued to cause much concern and, following repeated efforts by industry leaders, the Congress enacted the Naval Stores Act, approved March 3, 1923.

This statute established standards of identity for the several kinds of turpentine and prescribed uniform standards and grades for rosin developed by the U. S. Department of Agriculture.

The standards for turpentine are: gum spirits of turpentine, steam distilled wood turpentine, sulphate wood turpentine, and destructively distilled wood turpentine. To conform with these standards, turpentine is required to be of a purity and quality represented by specifications of The American Society for Testing Materials.

Pursuant to the Naval Stores Act, rosin is classified as: gum rosin, wood rosin, or tall oil rosin, depending on origin (gum, stump wood or tall oil).

Most primary inspections of rosin now are performed at strategically situated processing plants in the producing region. Generally, therefore, it is unnecessary that inspectors determine the class of rosin. This can be ascertained from certain peculiarities and characteristics of the rosin by crushing a small quantity between the fingers. The grading sample is an approximate 7/8 inch cube (following custom since

Continued on Page Fourteen

Official Grade Letter	Popular Assigned Name	Original I. A. C. Designation (now in disuse)
X	Extra Waterwhite	No. 1
WW	Waterwhite	White
WG	Window Glass	Glass
N	Nancy	Extra Grade
M	Mary	Grade
K	Kate	Low Grade
I	Isaac	Good No. 1

Continued from Page Thirteen

1856). Grading is done by matching the sample cube with official rosin standards.

The naval stores inspection service of the U. S. Department of Agriculture was established in 1927 pursuant to the Naval Stores Act and Regulations thereunder for use on a voluntary basis. The Act directed the Secretary of Agriculture to prepare permanent rosin standards for general use by the trade, on a loan basis. These standards are made of special glass with extremely narrow color tolerance, to represent the color of the respective grades of rosin, other than the lowest grade (B). Practically all inspection now is accomplished with these standards.

Distillation usually is completed at temperatures ranging between 315 and 350 degree F. Therefore, rosin (the residue after distillation) flows from the still in molten form directly into galvanized steel drums weighing 517-520 pounds, net, 4-ply paper bags containing 100 net pounds, and into tank cars for storage or shipment. Drums and bags are filled to uniform weights on platform dial scales, the accuracy of which is checked by federal inspectors at appropriate intervals.

Generally, resident inspectors licensed by the Department at ap-

proved processing plants perform rosin inspections with representative molded samples take from the second and last drums filled from each plant batch approximating 8 to 20 drums.

When inspections are performed by non-resident inspectors on drums of rosin at locations not equipped to fill to uniform weights, each drum is sampled through the filler opening by means of a mold placed there prior to filling, several inches below the top of the drum. These operations, therefore, include weighing; the inspection certificates thus show weights and grades.

Following inspection, drums and bags of rosin show the name or recorded identification mark of the processor, kind of rosin, batch number (if batch grading is practiced), gross and net weights and the grade. Tank car rosin inspection certificates show the grade and car number.

Turpentine specifications delimit the physical and chemical properties, including color, specific gravity, refractive index, initial boiling point, percentage distilling within established temperature ranges, distillation, polymerization, evaporation residue, and acidity. Ordinarily, any kind of freshly made turpentine, other than destructively

Continued on Page Fifteen

Continued from Page Fourteen

distilled turpentine, meets the same specifications; the latter is covered by a different specification. The principal turpentine color grades are "Waterwhite" and "Standard". Color may be determined by looking end-wise through a glass tube of turpentine. The column of turpentine so viewed must be adjusted to a depth that will give a color equal to the color of No. 1 yellow Lovibond

glass. To equal Waterwhite, the minimum depth should be 150 mm; for Standard, the depth range may be from 50 to 150 mm. Any column of a depth less than 50 mm. results in a color that is graded "Off Shade".

Acidity and specific gravity depend on proper distillation, handling and storage of turpentine. Acidity is expressed in terms of acid number, which represents the number of milligrams of potassium hydroxide required to neutralize one gram of turpentine. An acid number of 0.500 is the desired maximum limit. Specific gravity is a measure of the density of turpentine compared with the density of water at a temperature of 60°. Specific gravity limits for most turpentine are 0.860 minimum and 0.875 maximum. An acid number above the desirable limit and specific gravity higher than 0.875 indicate, among other things, contamination by rosin acid condensed and carried over with the turpentine during distillation, excessive oxidation and ageing or carelessness in storage. Any of these conditions inevitably lead to deterioration unless corrected.

Turpentine inspections include temperature readings for volume computations, clarity, foreign mat-

Continued on Page Seventeen

Thus, the Naval Stores Inspection Service insures a qualitative supply of turpentine and rosin. It enables buyers and sellers to trade in confidence on the basis of recognized grades and standards. The service facilitates the marketing of naval stores and reduces marketing costs by providing economical insurance against claims which, prior to establishment of the service, frequently beset the naval stores trade. There is no record in the U. S. Department of Agriculture of a substantiated quality claim against any federally inspected and certified naval stores. Use of the service by Federal Government Procurement Agencies would effect substantial savings by the avoidance of duplicate inspections by these agencies.

Federal inspection certificates enjoy a pre-eminent position in the marketing of naval stores. The Naval Stores Act provides that these certificates are prima facie evidence of the accuracy of analysis, classifications, and grades of the naval stores represented thereby and, thus, are judicially recognized. Moreover, these certificates support collateral loans obtained from

banking firms and Governmental corporations.

During the three crop years ended March 31, 1952, commercial turpentine inspections covered more than eight and three-quarter million gallons of turpentine (about 53 percent of the total U. S. gum production during this period). Additionally, over that period of time, more than three million gallons of gum turpentine were safely maintained in storage by the inspection service. Nearly 80 percent of the gum rosin crop also was federally inspected during this time. The inspection costs were insignificant, representing about $\frac{1}{8}$ of one percent of the value of the material inspected.