

Program Manager
USDA / AMS / TMP / NOP
Room 2945, South Building
P.O. Box 96456
Washington, DC 20090-6456

Topic: Petition to amend the National List

Category:

Nonagricultural (nonorganic) substances allowed in or on processed products labeled as “organic” or “made with organic (specified ingredients).”

Common Name: Charcoal / Activated Carbon

Current use: Charcoal / Activated carbon is used as a processing aid to absorb excess brown color pigments from White Grape Juice Concentrate.

Method of Application: Charcoal / Activated Carbon is added to White Grape Juice (Brix 16-32), mixed well and then filtered with diatomaceous earth to remove the Charcoal / Activated Carbon. The filtered White Grape Juice is then concentrated to 68 Brix to produce White Grape Juice Concentrate. See attached process flow diagram – A.

“Petition Justification Statement”: Canandaigua Concentrates has been producing “organic” White Grape Juice Concentrate since 1992 using Charcoal / Activated Carbon as an approved processing aid. Oregon Tilth has been our “organic” certifier.

Un-processed Organic White Grape Juice Concentrate browns severely as a result of oxidative reactions related to polyphenolics and amino acids / sugars.

The heavy brown color gives an unappealing color and imparts negative sensory attributes such as oxidized and over cooked aroma / flavor to the Organic White Grape Juice Concentrate.

Currently, all conventional and “Organic” White Grape Juice Concentrate are processed using Charcoal / Activated Carbon. The use of Charcoal / Activated Carbon as a processing aid dramatically improves the appearance, aroma and flavor of the White Grape Juice Concentrates.

Processing the “Organic” White Grape Juice Concentrate without the aid of Charcoal / Activated Carbon would produce a commercially unsaleable product to the market.

There are no alternative processing aids currently shown on The National List that we could use as a charcoal / Activated Carbon replacement.

Canandaigua Concentrate

ITEM B

Attached please find supportive information .

Manufactures Information:

The manufacturer's name address and telephone number:

Norit Americas Inc.
Suite 250, Building C
5775 Peachtree Dunwoody Road
Atlanta, GA 30342
Chem.tel: (800) 255-3924
Sales: (800) 641-9245
Marshall Plant: (903) 938-9211

Manufacturing Process: See attached – A & B.

The Merck Index: see attached - C.

Previous Certifications:

The Marshall production site is certified per ISO 9002. See attached certificate – D.
The K Type activated carbon is certified as Kosher, See attached certificate -E.
Norit Darco KB is certified to meet ANSI / NSF Standard 61 –Drinking Water System
Components for Health Effects. See attached certificate - F.

Regulatory Status :Activated carbon is GRAS in food processing per FDA, provided it meets the food grade specification per the FDA Food Chemical Codex. See attached letter from FDA and Norit Americas certification on K type activated carbons - G.

Chemical Abstract Service Number: 7440-440

Physical Properties – MSDS, see sections 2, 3, 6, 7, 9,10, 11, 12, 15 and 16. See attached - H.

Safety Information – MSDA attached – H.

Research information – Internet searches of AGRICOLA and ATTRA attached - I.

Canandaigua Concentrate Oregon Tilth Certified Organic: See attached – J.

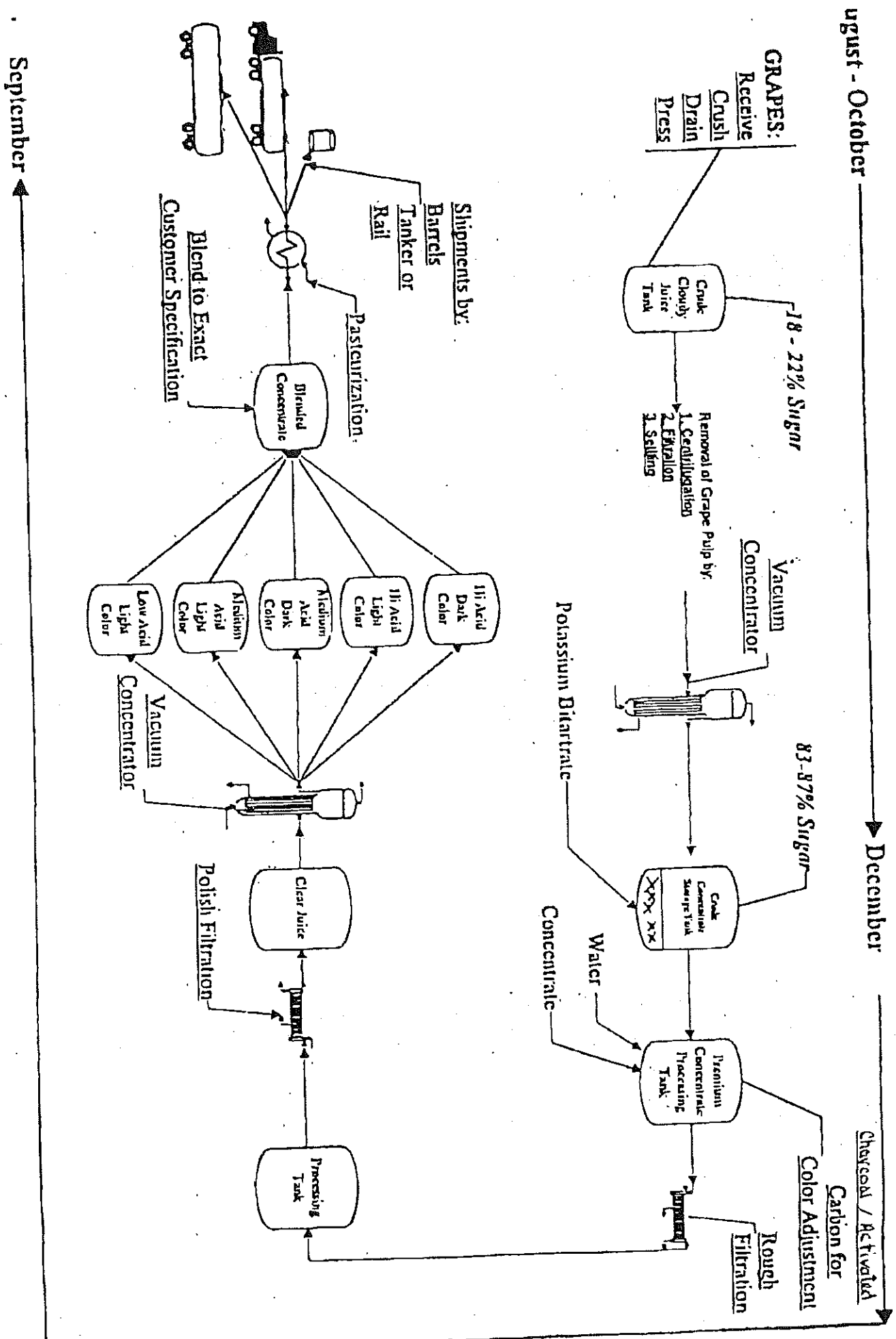
Food Chemical Codex: See attached – K

If you have any questions please call me at 559-661-5557.
Sincerely,



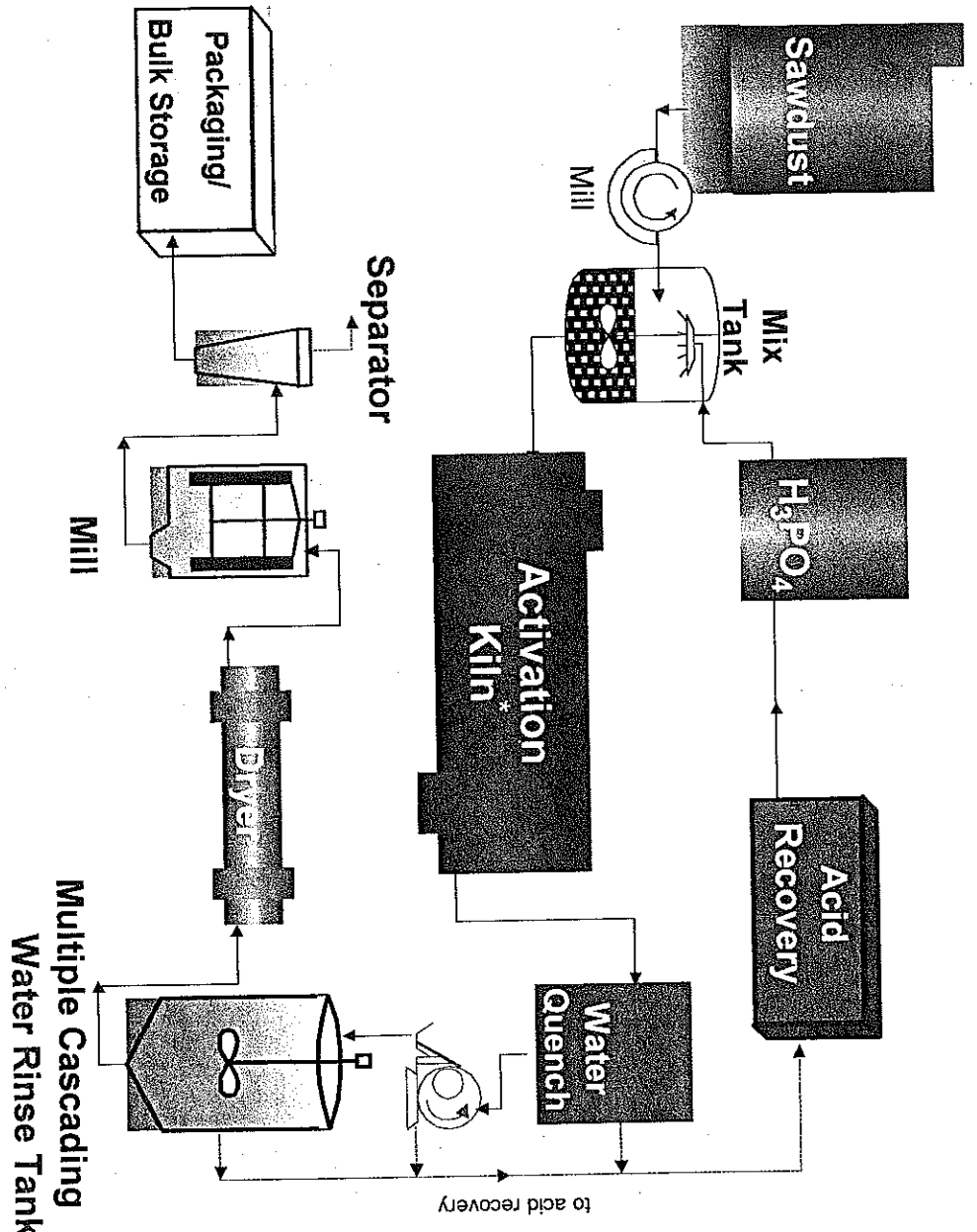
Rodger Williams
Director of New Business
Canandaigua Concentrates
12667 Road 24
Madera, CA 93639

Canandaigua Concentrate "Organic" White Grape Juice Concentrate Process Flow





K POWDER ACTIVATED CARBON PLANT FLOW DIAGRAM



©

THE MERCCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS, DRUGS, AND BIOLOGICALS

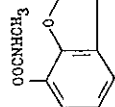
TENTH EDITION

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1983

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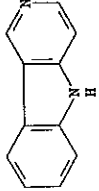
Carbofuran

White crystalline solid, mp 150-153°. Soly in water at 25°: 700 ppm. Unstable in alk. LD₅₀ orally in mice: 2 mg/kg; M. A. Fahmy et al., *J. Agr. Food Chem.* 18, 793 (1970).
 Use: Systemic insecticide, acaricide, nematocide. **Caution:** Cholinesterase inhibitor.

1787. Carbohydrazide. **Carbonic dihydrazide**; 1,3-diaminourrea. CH₂N₂O; mol wt 90.09. C 13.33%, H 6.71%, N 62.20%. O 17.76%. NH₂NHCONHNH₂. Prep'd by refluxing diethyl carbonate with hydrazine hydrate. Mohr et al., *Inorg. Syn.* 4, 32 (1953).

Crystals from water + ethanol, dec 153-154°. Freely sol in water. pH of 1% aq soln about 7.4. Practically insol in alcohol, ether, chloroform, benzene. Forms salts with acids. With nitrous acid it forms the highly explosive carbonyl azide CO(N₃)₂.

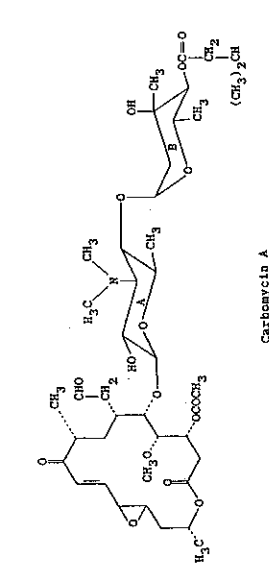
1788. γ -Carboline. 5H-Pyridol(4,3-b)indole; 2H-pyridol(4,3-b)indole. C₁₀H₈N₂; mol wt 168.19. C 78.55%, H 4.79%, N 16.66%. Prep'n: Robinson, Thornley, *J. Chem. Soc.* 125, 2169 (1924). Prep'n of derivs: Horlein, *Ber.* 87, 463 (1954); C. Ducrocq et al., *J. Heterocycl. Chem.* 12, 963 (1975). NMR studies: F. Balkau, M. L. Heffernan, *Aust. J. Chem.* 26, 1501, 1523 (1973).



Monoclinic needles from water, mp 225°, d 1.352. Can be distilled at atmospheric pressure without dec. Strong base. Freely sol in methanol; somewhat less sol in ethanol. Slightly sol in benzene, water.
 Picrate, yellow needles, mp 250°.

1789. Carbolineum®. A brand of chlorinated anthracene oil (coal tar fraction).
 Use: To spray hen houses in the control of chicken mites; as wood preservative; against termites.

1790. Carbomycin. Magnamycin. Sixteen-membered-ring macrolide antibiotic complex similar to leucomycin, q.v. and erythromycin, q.v., produced by *Streptomyces halstedii*: F. W. Tanner et al., *Antibiot. & Chemother.* 2, 441 (1952). Two components have been isolated: Carbomycin A (major) and carbomycin B. Isolat of A: Friedman et al., U.S. pat. 2,960,438 (1960 to Pfizer); of B: F. A. Hochstein, K. Murai, *J. Am. Chem. Soc.* 76, 5080 (1954). Structure of A and B: R. B. Woodward, *Angew. Chem.* 69, 50 (1957); revised structure: M. Kuehne, B. W. Benson, *J. Am. Chem. Soc.* 87, 4660 (1965); R. B. Woodward et al., *ibid.* 4662. Abs config of A and B: W. D. Celmer, *ibid.* 88, 5028 (1966).



Carbomycin A

Carbomycin A, C₄₂H₆₇NO₁₆. 9-deoxy-12,13-epoxy-9-oxoleucomycin V 3-acetate 4 β . (3-methylbutanoate), M-4209, magnamycin A, deltamycin A₄. Blunt needles from ethanol, mp 214°. [α]_D²⁵ -58.6° (chloroform). uv max (abs ethanol): 238, 327 nm (E_{1%}^{1cm} 185, 0.9). Carbomycin standard is the free base having a potency of 1080 units/mg. For stability of soln data see H. L. Martin, *Antibiot. & Chemother.* 3, 865 (1953). Weak base, pK_b 7.2. Solubilities determined by Weiss et al., *ibid.* 7, 374 (1957) in mg/ml at about 28°: water 0.295; methanol > 20; ethanol > 20. LD₅₀ i.v. in mice: 550 mg/kg.

Carbomycin B, C₄₂H₆₇NO₁₆. 9-deoxy-9-oxoleucomycin V 3-acetate 4 β . (3-methylbutanoate), magnamycin B. Colorless anisotropic plates from acetone/water; mp 141-144° (dec), softens at 138°. [α]_D²⁵ -35° (c = 1 in chloroform). uv max (abs ethanol): 278 nm (E_{1%}^{1cm} 276). pK_b 7.56. Solubilities in mg/ml at 25°: ethanol 450; water 0.1-0.2.

Therap. Cat: Antibiotic.

Therap. Cat (VED): Antimicrobial.

1791. Carbon. C_s at wt 12.01115; at. no. 6; valence 4. Stable isotopes: 12 (99.892%); 13 (1.108%); radioactive isotopes: 9-11; 14-16. Abundance in earth's crust: approx 0.027%. Cosmic abundance: 6 atoms/atom Si. Occurs in 3 forms: (1) Diamond, q.v.; (2) Graphite, q.v. or black lead; (3) Amorphous carbon such as coal, lampblack, and the various forms of artificial carbon. Comprehensive reviews: P. L. Walker, *Ann. Sci. 50*, 259-293 (June 1962); Holliday et al., in *Comprehensive Inorganic Chemistry* vol. 1, I. C. Bailar, Jr. et al., Eds. (Pergamon Press, Oxford, 1973) pp 1173-1294; several authors in Kirk-Othmer *Encyclopedia of Chemical Technology* vol. 4 (Wiley-Interscience, New York, 3rd ed., 1978) pp 556-709.

¹⁴C isotope, continuously formed in the earth's atm by the bombardment of nitrogen with cosmic neutrons according to the reaction ¹⁴N + ¹n \rightarrow ¹⁴C + ¹H. The ¹⁴C is rapidly oxidized to CO₂ in this form it penetrates into animals and plants by photosynthesis and metabolism. The ¹⁴C content of living matter is estimated at 15.3 disintegrations per minute and per gram of carbon, corresponding to the equilibrium reached between formation of ¹⁴C and its exchange with ¹²C. This equilibrium stops when the plant or animal dies, and the ¹⁴C content begins to decrease, because the ¹⁴C decays with a half-life of 5760 years. This fact can be used to date organic matter (not more than 40,000 years old) by comparison with the standard 15.3 disintegrations per min per gram: M. Haassinsky, J. P. Adloff, *Radiochemical Survey of the Elements* (Elsevier, New York, 1965) pp 30-32.

1792. Carbon, Amorphous. Carbon black; carbon, activated; carbon, decolorizing. A quasi-graphitic form of carbon of small particle size. By the term "carbon black" several forms of artificially prepared carbon or charcoal are designated, e.g.: (1) *Animal charcoal*, obtained by charring bones, meat, blood, etc.; (2) *Gas black*; *furnace black*; *charbonel black*; C.I. 77266; obtained by incomplete combustion of natural gas; (3) *Lamp black*, obtained by burning various

others are used as a pigment for rubber tires; for printing, stenciling and drawing inks; for leather; stove polish, phonograph records, electrical insulating apparatus. Activated charcoal (from the destructive distillation of various organic materials) is used in medicine, e.g. Opocarbyl; Norit; Ultracarbon. **Caution:** Carbon black obtained by the impingement or channel process, also known as gas black and channel black, has been banned by the FDA for use as a color additive in foods, drugs and cosmetics.

Therap. Cat: Activated charcoal as antidote; adsorptive, externally in foul wounds.

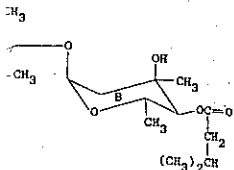
1793. Carbon Dioxide. Carbonic acid gas; carbonic anhydride. CO₂; mol wt 44.01. C 27.29%, O 72.71%. Occurs in the atm of many planets. In our solar system, e.g., on Venus, the optical layer thickness due to CO₂ is 100,000 cm/atm, but only 220 cm/atm on Earth. Analyses of air in the temperate zones of the Earth show 0.027 to 0.036% (v/v) of CO₂; G. P. Kuiper, *The Atmospheres of the Earth and the Planets* (Univ. of Chicago Press, 1949); Landolt-Bornstein, *Zahlenwerte* vol. III (Springer-Verlag, 6th ed., 1952) pp 59 and 585. Constituent of carbonate type of minerals and products of animal metabolism. Necessary for the respiratory cycle of plants and animals. Obtained industrially as a by-product in the manu of lime during the "burning" of limestone (CaCO₃). Also produced by burning coke or other carbonaceous material. In the U.S.A. large amounts are produced by fermentation (Backus process and Reich process). When glucose is fermented by yeast, the chief products are ethyl alcohol and CO₂. Prep'd in the laboratory by dropping acid on a carbonate: E. H. Archibald, *The Preparation of Pure Inorganic Substances* (Wiley, New York, 1932) p 196; Loomis, Walters, *J. Am. Chem. Soc.* 48, 3103 (1926). Purification: Glensier in *Handbook of Preparative Inorganic Chemistry*, G. Brauer, Ed. (Academic Press, New York, 2nd ed., 1963) p 647. Reviews: E. L. Quinn, *J. Chem. Ed.* 7, 151-162 and 403-419 (1930); J. Kuprianoff, *Die feste Kohlensture (Trockeneis)* (Enke, Stuttgart, 1939); E. L. Quinn, C. L. Jones, *Carbon Dioxide* (Reinhold, New York, 1947); W. R. Ballou, in *Kirk-Othmer Encyclopedia of Chemical Technology* vol. 4 (Interscience, New York, 3rd ed., 1978) pp 725-742.

Colorless, odorless, noncombustible gas. Faint acid taste. Usually a nonsupporter of combustion, although burning magnesium continues to burn when transferred into a CO₂ atm. Usually marketed in steel cylinders (under sufficient pressure to keep it liquid) or in solid form as *Dry Ice* (compressed carbon dioxide snow, d 1.35). At atmospheric pressures the solid form changes into the gaseous phase without liquefaction. d (gas) 1.527 (air = 1); d (gas) 1.557 (N₂ = 1); abs d 0.1146 lb/cu ft at 25°; vol at 25°: 8.76 cu ft/lb. d (gas, 0°) 1.976 g/l at 760 mm; d (liq, 0°) 0.914 at 34.3 atm; d (solid, -56.6°) 1.512. Sublimes at -78.48° (760 mm). mp_{2.2mm} -56.6°. The gas is not affected by heat until temp reaches about 2000°. Crit temp 31.3°; crit press 72.9 atm; crit density 0.464. Triple point -56.6° at 5.11 atm. Vapor press at -120°: 10.5 mm; at -100°: 104.2 mm; at -82°: 569.1 mm. Heat of formation 94.05 kcal/mol. Latent heat of vaporization 83.12 g cal/g. Specific heat 0.19 to 0.21 Btu/lb. Soly in water (ml CO₂/100 ml H₂O at 760 mm): 0° = 171; 20° = 88; 60° = 36. More sol at higher pressures. Less sol in alcohol, ether neutral organic solvents. Absorbed by alkaline solns with the formation of carbonates. **Caution:** When shipped in steel cylinders, CO₂ is in the form of gas over liquid and at 20° exerts a pressure of 830 psi. Humans cannot breathe air contg more than 10% CO₂ without losing consciousness. Use gloves when handling dry ice, as its temp is at least -78.5°; momentary skin contact with dry ice has caused serious frostbites and blisters.

Consult the cross index before using this section.

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Y. Shimauchi et al., *J. Am. Chem. Soc.* 80, 2837 (1958); K. Tatsuta et al., *J. Am. Chem. Soc.* 80, 2837 (1958); Retrosynthetic analysis, *J. Am. Chem. Soc.* 80, 2837 (1958); *Antibiotics* Vol. 1, D. Ringer-Verlag, New York, 1958; *Fortschr. Chem.*



-deoxy-12,13-epoxy-9-oxo-ethylbutanoate), *M-4209*, white needles from ethanol, mp 141-144° (dec). uv max (abs ethanol): 260 mμ. Infrared: 1710 cm⁻¹ (C=O), 1610 cm⁻¹ (C=C), 1510 cm⁻¹ (C=C), 1450 cm⁻¹ (C=C), 1380 cm⁻¹ (C=C), 1320 cm⁻¹ (C=C), 1270 cm⁻¹ (C=C), 1180 cm⁻¹ (C=C), 1100 cm⁻¹ (C=C), 1050 cm⁻¹ (C=C), 1010 cm⁻¹ (C=C), 960 cm⁻¹ (C=C), 910 cm⁻¹ (C=C), 860 cm⁻¹ (C=C), 810 cm⁻¹ (C=C), 760 cm⁻¹ (C=C), 710 cm⁻¹ (C=C), 660 cm⁻¹ (C=C), 610 cm⁻¹ (C=C), 560 cm⁻¹ (C=C), 510 cm⁻¹ (C=C), 460 cm⁻¹ (C=C), 410 cm⁻¹ (C=C), 360 cm⁻¹ (C=C), 310 cm⁻¹ (C=C), 260 cm⁻¹ (C=C), 210 cm⁻¹ (C=C), 160 cm⁻¹ (C=C), 110 cm⁻¹ (C=C). Solubilities: water 10 mg/ml at about 28°; water 20. LD₅₀ i.v. in mice: 550 mg/kg.

-deoxy-9-oxoleucomycin V magnamycin B. Colorless powder, mp 141-144° (dec). uv max (abs ethanol): 260 mμ. Infrared: 1710 cm⁻¹ (C=O), 1610 cm⁻¹ (C=C), 1510 cm⁻¹ (C=C), 1450 cm⁻¹ (C=C), 1380 cm⁻¹ (C=C), 1320 cm⁻¹ (C=C), 1270 cm⁻¹ (C=C), 1180 cm⁻¹ (C=C), 1100 cm⁻¹ (C=C), 1050 cm⁻¹ (C=C), 1010 cm⁻¹ (C=C), 960 cm⁻¹ (C=C), 910 cm⁻¹ (C=C), 860 cm⁻¹ (C=C), 810 cm⁻¹ (C=C), 760 cm⁻¹ (C=C), 710 cm⁻¹ (C=C), 660 cm⁻¹ (C=C), 610 cm⁻¹ (C=C), 560 cm⁻¹ (C=C), 510 cm⁻¹ (C=C), 460 cm⁻¹ (C=C), 410 cm⁻¹ (C=C), 360 cm⁻¹ (C=C), 310 cm⁻¹ (C=C), 260 cm⁻¹ (C=C), 210 cm⁻¹ (C=C), 160 cm⁻¹ (C=C), 110 cm⁻¹ (C=C). Solubilities: water 10 mg/ml at about 28°; water 20. LD₅₀ i.v. in mice: 550 mg/kg.

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found in the earth's atm by cosmic neutrons according to H. The ¹⁴C is rapidly oxidized into animals and plants. The ¹⁴C content of living organisms is 15.3 disintegrations per minute corresponding to the equilibrium of ¹⁴C and its exchange with the plant or animal reservoir. This fact can be used to date objects (more than 40,000 years old) by measuring the disintegrations per minute. *Radiochemical Survey* (New York, 1965) pp 30-32.

Carbon black; carbon, amorphous; quasi-graphitic form of carbon. The term "carbon black" is used for carbon or charcoal obtained by charring organic materials; *furnace black*; *channel black*; *incomplete combustion* of organic materials by burning various

fats, oils, resins, etc., under suitable conditions; (4) *Activated charcoal*, e.g. *Carboraffin*, *Medicoal*, *Norit*, *Opocarbyl*, *Ultra-carbon*, prep'd from wood and vegetables. Monograph: H. W. Davidson et al., *Manufactured Carbon* (Pergamon Press, New York, 1968). *Reviews*: Cohan in *Science of Petroleum* vol. V, Pt 2, B. T. Brooks, A. E. Dunstan, Eds. (Oxford Univ. Press, 1953), pp 79-89; Smisek, Cerny, *Active Carbon* (Elsevier Publishing Co., Amsterdam, 1970).

USE: Number (4), e.g. Norit, Carboraffin, is used chiefly for clarifying, deodorizing, decolorizing and filtering. The others are used as a pigment for rubber tires; for printing, stenciling and drawing inks; for leather; stove polish, phonograph records, electrical insulating apparatus. Activated charcoal (from the destructive distillation of various organic materials) is used in medicine, e.g., Opocarbyl; Norit; Ultra-carbon. *Caution*: Carbon black obtained by the impingement or channel process, also known as gas black and channel black, has been banned by the FDA for use as a color additive in foods, drugs and cosmetics.

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USE: In the carbonation of beverages; manu of carbonates; in fire prevention and extinction; for inerting flammable materials during manu, handling and transfer; as propellant in aerosols; as dry ice for refrigeration; to produce harmless smoke or fumes on stage; as rice fumigant; as antiseptic in bacteriology and in the frozen food industry.

THERAP CAT: Respiratory stimulant.

THERAP CAT (VET): Respiratory stimulant (inhalant).

1794. Carbon Diselenide. *Carbon selenide*. CSe₂; mol wt 169.93. C 7.07%, Se 92.93%. Prep'd by the action of methylene chloride vapor on heated selenium: Ives et al., *J. Chem. Soc.* 1947, 1080; or from a mixture of CCl₄ and H₂Se in a stream of N₂ at 500°: Grimm, Metzger, *Ber.* 69, 1356 (1936); from the elements by electrical discharge on Se vapor in the presence of sugar charcoal: Stuedel, *Z. Anorg. Allgem. Chem.* 361, 195 (1968).

Light-sensitive, golden yellow, strongly refractive, liquid. Odor of rotten radishes. Turns brown to black on storage. d₄²⁰ 2.6824; d₄²⁵ 2.6626. mp -45.5°. bp 125-126°; bp₈₀ 10.0°. n_D²⁰ 1.845. Heat of formation: 34 kcal/mol. Miscible with carbon tetrachloride, carbon disulfide, toluene, other organic solvents. Practically insol in water. Dec by alc, pyridine.

1795. Carbon Disulfide. Carbon bisulfide; dithiocarbonic anhydride. CS₂; mol wt 76.14. C 15.77%, S 84.23%. Minute amounts occur in coal tar and in crude petroleum. Prep'd on an industrial scale by heating charcoal with vaporized sulfur; from sulfur and natural gas: Faith, Keyes & Clark's *Industrial Chemicals*, F. A. Lowenheim, M. K. Moran, Eds. (Wiley-Interscience, New York, 4th ed., 1975) pp 224-229. Laboratory purification: Glemser in *Handbook of Preparative Inorganic Chemistry* vol. 1, G. Brauer, Ed. (Academic Press, New York, 2nd ed., 1963) p 652. Review of production and uses: Bushell, *Chem. & Ind. (London)* 1961, 1465; R. W. Timmerman in *Kirk-Othmer Encyclopedia of Chemical Technology* vol. 4 (Wiley-Interscience, New York, 3rd ed., 1978) pp 742-757.

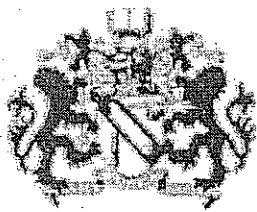
Highly refractive, mobile, very flammable liq. *Poisonous!* The purest distillates ever obtained are reported to have a sweet, pleasing, and ethereal odor, while the usual commercial and reagent grades are foul smelling. Dec on standing for a long time. Burns with a blue flame to CO₂ and SO₂. *Acute fire and explosion hazard*, can be ignited by hot steam pipes. Flash pt, closed cup: -22°F (-30°C). Ignition pt: 100°. Explosive range: 1 to 50% (v/v) in air. d₄²⁰ 1.29272; d₄²⁵ 1.27055; d₄³⁰ 1.2632; d₄³⁵ 1.24817. Vapors sink to the ground. Vapor density 2.67 (air = 1). Fp: -111.6°. bp₁₀ -73.8°; bp₁₀₀ -44.7°; bp₁₀₀₀ -5.1°; bp₂₀₀₀ +28.0°; bp₇₆₀ +46.5°; bp_(2 atm) +69.1°; bp_(5 atm) +104.8°. Crit temp 280.0°; crit press. 72.9 atm. n_D²⁰ 1.63189; n_D³⁰ 1.62803; n_D²⁵ 1.62543. Surface tension at 20°: 32.25. Coefficient of viscosity at 20°: 0.363. Heat of vaporization at bp: 84.1 cal/g. Heat of fusion: 1.049 kcal/mole. Heat capacity at 24.3°: 18.17 cal/mole-deg. Brown, Manov, *J. Am. Chem. Soc.* 59, 500 (1937). Ebullicoscopic constant: 2.35°. Dielectric constant at low frequencies: 2.641. Dipole moment: 0.0. Soly in water at 20°: 0.294%. Soly of water in CS₂: <0.005%. Azeotrope with water bp 42.6°, contains 97.2% CS₂. Misc with anhydrous methanol, ethanol, ether, benzene, chloroform, carbon tetrachloride, oils. Can be stored in iron, aluminum, glass, porcelain, Teflon.

Caution: Poisoning usually occurs from inhalation but also may be caused by ingestion and skin absorption. *Acute Toxicity*: euphoria, restlessness, mucous membrane irritation, nausea, vomiting, unconsciousness, terminal convulsions. *Chronic Toxicity*: marked psychic disturbances ranging from extreme irritability to mania with hallucinations, tremors, auditory and visual disturbances, weight loss, blood dyscrasias. Dermal contact with concd solns may cause burning pain, erythema, exfoliation. See: *Clinical Toxicology of Commercial Products*, R. E. Gosselin et al., Eds. (Williams & Wilkins, Baltimore, 4th ed., 1976) Section III, pp 83-86.

USE: In the manu of rayon, carbon tetrachloride, xanthogenates, soil disinfectants, electronic vacuum tubes. Solvent for phosphorus, sulfur, selenium, bromine, iodine, fats, resins, rubbers.

1796. Carbonic Anhydrase. *Carbonate dihydratase*; carbonate hydro-lyase. Mol wt approx 30,000. A small zinc-

10



Certificate of Registration

This is to certify that

NORIT AMERICAS INC.

P.O. BOX 790
3200 WEST UNIVERSITY
MARSHALL, TEXAS 75671
U S A

hold Certificate No. FM 36335 and operate a quality management system which complies with the requirements of BS EN ISO 9002:1994 for the activities detailed in the scope of registration.

Originally registered 28 February 1997
This certificate does not expire. To check its validity telephone 1753-447000.

Reg Blaise (Director)



BSI, Inc. • 12110 Sunset Hills Road • Suite 1-80 • Reston, VA 20190-3231

Note: This is not a legal document and cannot be used as such.

010012345



Orthodox Union

Union of Orthodox Jewish Congregations of America • איחוד קהילות האורתודוקסים באמריקה

11 Broadway New York, NY 10004 * Tel: (212) 563-4000 * Fax: (212) 564-9058 * www.ou.org

February 15, 2002

TO WHOM IT MAY CONCERN:

This is to certify that the following products, listed under their respective brand names, prepared by

Norit Americas, Inc., Atlanta, GA 30342

At the following facility:

Norit Americas, Inc.-Marshall, Marshall, TX 75670,

are manufactured under the supervision of the Kashruth Division of the Orthodox Union and are kosher when bearing the symbol adjacent to each product as indicated below. Products designated below as OU are certified kosher pareve. The company is authorized to place only this symbol on packaging. Products that appear below with one asterisk are Kosher for Passover and year-round use.

Brand: Darco

- Darco A-51
- Darco KBB-FF
- Darco LFP
- Darco MRX

Symbol

OU
OU
OU
OU

Brand: Norit Americas

- Darco - 80 X 325
- * Darco 12x20
- Darco 12x20 DC
- * Darco 12x20 LI
- Darco 12x20 PT
- * Darco 12x40
- * Darco 20x40
- Darco 20x40 LI
- Darco 20x50
- * Darco 4x12
- Darco 8x30
- * Darco FGD
- * Darco FGL
- * Darco FM-1
- Darco Fructoblend

Symbol

OU
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Menachem Genack

Rabbi Menachem Genack
Rabbinic Administrator

Effective from 03/01/2002 through 02/28/2003

Page: 1 of 3

E.



Orthodox Union

איחוד קהילות האורתודוקסים באמריקה • Union of Orthodox Jewish Congregations of America

11 Broadway New York, NY 10004 * Tel: (212) 563-4000 * Fax: (212) 564-9058 * www.ou.org

February 15, 2002

LETTER OF CERTIFICATION - continued

Company: Norit Americas, Inc.

Brand: Norit Americas - Cont.

Symbol

| | |
|---------------------|----|
| • * Darco G-60 | OU |
| • * Darco GFP | OU |
| • Darco Grosafe | OU |
| • Darco Insul | OU |
| • Darco K-150 | OU |
| • * Darco KB | OU |
| • Darco KB-44 | OU |
| • * Darco KB-B | OU |
| • * Darco KB-FF | OU |
| • Darco KB-FG | OU |
| • Darco Premium | OU |
| • * Darco S-51 | OU |
| • Darco S-51 HF | OU |
| • * Darco S-51-A | OU |
| • * Darco S-51-CR | OU |
| • * Darco S-51-FF | OU |
| • Darco S-51-FFM | OU |
| • * Darco S-51-H | OU |
| • Darco S51-HFM | OU |
| • * Darco S-51-T | OU |
| • * Darco TRS | OU |
| • Hydrodarco - 3000 | OU |
| • Hydrodarco - 4000 | OU |
| • Hydrodarco - 816 | OU |
| • Hydrodarco - B | OU |
| • Hydrodarco - C | OU |
| • Hydrodarco - H | OU |
| • Hydrodarco - O | OU |
| • Hydrodarco - R | OU |
| • Hydrodarco - W | OU |
| • Hydrodarco 8x20 | OU |

Rabbi Menachem Genack
Rabbinic Administrator

Effective from 03/01/2002 through 02/28/2003

Page: 2 of 3

ⓔ

Established 1898

בס"ד



Orthodox Union

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February 15, 2002

LETTER OF CERTIFICATION - continued

Company: Norit Americas, Inc.

Brand: Norit Americas - Cont.

Symbol

• Petrodarco - 4 X 10

OU

• Petrodarco - 8 X 30

OU

• Vapure 610

OU

• Vapure 612

OU

This certification is effective from March 1, 2002 through February 28, 2003, and is subject to renewal at that time.

Sincerely yours,

UNION OF ORTHODOX JEWISH
CONGREGATIONS OF AMERICA

Rabbi Menachem Genack
Rabbinic Administrator

(F.)

NSF International

RECOGNIZES

NORIT AMERICAS INC.

Plant At: MARSHALL, TX

AS COMPLYING WITH ANSI/NSF 61.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.



Certification Program
Accredited by the
American National
Standards Institute



Certification Program
Accredited by RVA,
the Dutch Council
for Accreditation



Certification Program
Accredited by the
Standards Council
of Canada

This certificate is the property of NSF International and must be returned upon request. To verify certification, call 800 NSF-MARK or (1) 734 769-8010.

Stan S. Lazar, General Manager
Drinking Water Additives

January 12, 2000

Certificate #02160/02162B

G.



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
Washington, DC 20204

June 23, 1999

Mark Cummings
Norit Americas Inc.
1050 Crown Point Parkway
Suite 1500
Atlanta, GA 30338

Dear Mr. Cummings:

This responds to your inquiry of June 10, 1999, concerning the generally recognized as safe (GRAS) status of activated carbon in food processing.

Activated carbon is considered GRAS for use in food processing applications, provided it meets the food grade specifications for activated carbon in the Food Chemicals Codex, 4th Ed. (1996) and it is removed from food after processing.

If you have any further questions concerning this matter, please do not hesitate to contact us.

Sincerely,

A handwritten signature in cursive script that reads "Lawrence J. Lin".

Lawrence J. Lin, Ph.D.
Division of Petition Control, HFS-215
Center for Food Safety
and Applied Nutrition

H.

NORIT Americas Inc.

Most Choices + Precise Fit = Best Performance.

INFORMATION SHEET

No. 28-1
Sep 2001

Food Chemicals Codex

Testing Program for U.S. Activated Carbons

NORIT Americas Inc. has an extensive program to routinely test its food grade carbons against the FCC specifications and has done so for over twenty years. During that time, no product sample has failed to meet the FCC requirements for activated carbon.

Our testing program randomly selects individual lot samples of carbon based upon similar product groups (for example, carbons which only differ in particle size, but are identical in every other respect). Testing is done on a quarterly basis and encompasses roughly 1 to 2% of all lots produced. Given the continued success of the random testing program, we feel confident that these activated carbons fully meet the Food Chemicals Codex requirements.

Results of these tests are available upon request.

Carbons included in the test program:

MARSHALL PRODUCTS

- Granular DARCO and HYDRODARCO carbons: 12x40, 12x20, 20x40, 20x50, 80x325, HD 816, HD 820, HD 3000, HD 4000
- Acid-washed, powdered carbons: A-51, S-51, S-51A, S-51CR, S-51FF, S-51FFM, S-51H, S-51HF, S-51HFM
- Chemically activated, powdered carbons: KB, KBB, KB-FF, KB-FG, KB-44

PRYOR PRODUCTS

- Granular carbons: GAC 1240, GAC 1240A, GAC 250, GAC 30S, GAC 40S, GAC 40SAB, GAC 610, GAC 816, GAC 820, GAC 830
- Powdered carbons: PAC 200, PAC 20B
- Magnesite incorporated, granular carbons: MAG 30I, MAG 40I
- Acid-washed, granular carbons: GAC 1240 PLUS, GAC 1240A PLUS, GAC 830 PLUS

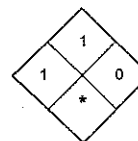




MATERIAL SAFETY DATA SHEET

NORIT MSDS No. 103
Revision Date: July 27, 2001
Revision No. 02

NFPA HAZARD SYMBOL



4-Extreme
3-High
2-Moderate
1-Slight
0-Insignificant
*-See Section 16 for Special Hazards

Chemically Activated Carbons

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

NORIT Americas Inc. Suite 250, Building C, 5775 Peachtree Dunwoody Rd. Atlanta, GA 30342

Emergency Telephone Numbers:

CHEM•TEL Inc. (800) 255-3924 (24 hour) Sales Office (800) 641-9245 Marshall Plant (903) 923-1000

Names used on product labels:

- DARCO® KB
- DARCO® KBB
- DARCO® KBFF
- DARCO® KB44
- DARCO® KBFG
- DARCO® KBC
- DARCO® K150
- NORIT® CAE
- NORIT® CAE +

DARCO® and NORIT® are registered trademarks of NORIT Americas Inc.

Chemical Name • Activated Carbon
Product Use • Liquid and vapor applications (purification, decolorization, separation, and deodorization)

2. COMPOSITION / INFORMATION ON INGREDIENTS

| IDENTITY | CAS NO. | % | OSHA HAZARD |
|------------------|-----------|-----|-------------|
| Activated Carbon | 7440-44-0 | 100 | NO |

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Odorless black powder. **Activated carbon (especially when wet) can deplete oxygen from air in enclosed spaces, and dangerously low levels of oxygen may result.** When workers enter a vessel containing activated carbon, procedures for potentially low oxygen areas should be followed. Workers should also take appropriate precautions when dealing with spent (used) activated carbons, which may exhibit properties of adsorbed materials.

This material may be self-heating under certain conditions. See Section 16.

POTENTIAL HEALTH EFFECTS:

Medical conditions aggravated by exposure: None documented

Routes of Exposure:

- Eyes: • Not corrosive, but like most particulate materials, may cause mild physical irritation.
- Skin: • Not corrosive and not a primary skin irritant. Mild irritation is possible due to abrasive action of dust.
- Ingestion: • No known deleterious effects.
- Inhalation: • Possible mild irritation of respiratory tract due to drying and abrasive actions of dust.
- Chronic Effects: • IARC: Not listed • NTP: Not listed • OSHA: Not regulated

For additional information, see Section 16.

4. FIRST AID MEASURES

- Skin: • Wash material off the skin with soap and water. Seek medical attention if irritation occurs.
- Eyes: • Flush with copious amounts of water. Seek medical attention if irritation occurs.
- Ingestion: • Give one or two glasses of water to drink. Seek medical attention if gastrointestinal symptoms develop.
- Inhalation: • Remove to fresh air. Seek medical attention if cough or respiratory symptoms develop.



5. FIRE FIGHTING MEASURES

- | | |
|----------------------------|---|
| Flashpoint | • Not Applicable. |
| Non-flammable | • OSHA Method 16CFR1500.44 (Incorporated by reference in 29CFR1910.1200). |
| Self-heating substance | • May self heat. UN Manual of Tests and Criteria, Test N.3. |
| Flammability Limits in Air | • LFL and UFL Not Applicable. |

GENERAL HAZARD:

Activated carbon is difficult to ignite and tends to burn slowly (smolder) without producing smoke or flame. Toxic gas may form upon combustion. Chemically activated carbons can self-heat under certain conditions.

FIRE FIGHTING INSTRUCTIONS:

If possible to do safely, move smoldering activated carbon to a non-hazardous area, preferably out of doors. Extinguish fire using water fog, fine water spray, carbon dioxide or foam. Avoid stirring up dust clouds.

FIRE FIGHTING EQUIPMENT:

Fire fighting personnel should wear full protective equipment, including self-contained breathing apparatus (SCBA) for all inside fires and large outdoor fires.

HAZARDOUS COMBUSTION PRODUCTS:

Products may include smoke and oxides of carbon (for example, carbon monoxide). Materials allowed to smolder for long periods in enclosed spaces, may produce amounts of carbon monoxide which reach the lower explosive limit (carbon monoxide LEL = 12.5% in air). Under certain conditions, any airborne dust may be an explosion hazard. Used activated carbon may produce additional combustion products.

6. ACCIDENTAL RELEASE MEASURES

IF A SPILL OR LEAK OCCURS:

Clean up spills in a manner that does not disperse dust into the air. Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure, and removal of material from eyes, skin, and clothing.

DISPOSAL METHOD:

Dispose of virgin (unused) carbon (waste or spillage) in a facility permitted for non-hazardous wastes. Spent (used) carbon should be disposed of in accordance with applicable laws.

CONTAINER DISPOSAL:

Do not reuse empty bags. Dispose of used bags in facility permitted for non-hazardous wastes.

7. HANDLING AND STORAGE

- | | |
|----------------------|--|
| Storage Temperature: | • Ambient. Avoid storing at high temperatures in direct sunlight. |
| Storage Pressure: | • Atmospheric |
| Handling: | • Follow good handling and housekeeping practices to minimize spills, generation of airborne dusts, and accumulation of dusts on exposed surfaces. • Use with adequate exhaust ventilation to draw dust away from workers' breathing zones. • Prevent or minimize exposures to dusts by using appropriate respirators, gloves, and eye protection. • Wash exposed skin areas thoroughly with soap and water after handling. |
| Storage: | • Product should be stored in a closed dry container. Maintain good housekeeping procedures. Store this product away from strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc. Avoid storing at high temperatures in direct sunlight. |

H.



DARCO ® Chemically Activated Carbons

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- Engineering Controls: • Use local exhaust ventilation to control emissions near the source. Ventilation systems should be sized and configured to prevent exceedence of recommended or regulated exposure limits (for example, OSHA PELs).
- Eye Protection: • Safety glasses with side shields are recommended for any type of handling. Where eye contact or dusty conditions may be likely, dust tight goggles are recommended. Have eye-flushing equipment available.
- Skin Protection: • Avoid skin contact with this product. Wear appropriate dust resistant clothing. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.
- Respiratory Protection: • Keep dust exposure to a minimum with engineering and administrative controls. Use appropriate NOISH/MSHA approved particulate respirators if necessary. Observe respirator use limitations specified by NOISH/MSHA or the manufacturer.

Airborne Exposure Guidelines:

| Activated Carbon | OSHA PEL | ACGIH TLV |
|---------------------|-----------------------|-----------------------|
| Total Dust | 15mg/m ³ * | 10mg/m ³ * |
| Respirable Fraction | 5mg/m ³ * | Not Established |

*OSHA and ACGIH have not established specific exposure limits for this material. Given limits are for particulates not otherwise classified. These limits are stated only to indicate the least stringent airborne dust exposure levels applicable to nuisance dusts. OSHA or ACGIH has set no ceiling or short-term exposure limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|------------------------------|-----------------------------|---------------------|-----------------------------|
| Boiling Point, C: | • NA | Freezing Point, C: | • NA |
| Bulk Density - Powder Grades | • 12-30 lbs/ft ³ | % Volatiles | • NA |
| Vapor Pressure | • NA | Solubility in Water | • Insoluble |
| Vapor Density | • NA | Appearance and Odor | • Black powder with no odor |
| Evaporation Rate | • NA | | |

NA - Not applicable

10. STABILITY AND REACTIVITY DATA

- Stability: • This product is stable under the specified conditions of storage, shipment and use. Avoid storing at high temperatures or in direct sunlight.
- Incompatibility: • Contact with strong oxidizers such as ozone, liquid oxygen, chlorine, permanganate, etc. may result in rapid combustion. Avoid contact with strong acids.
- Hazardous Decomposition Products: • Oxides of Carbon
- Hazardous Polymerization: • Does not occur.

11. TOXICOLOGICAL INFORMATION

This material is non-toxic. Used activated carbon may exhibit characteristics of the adsorbed material.

12. ECOLOGICAL INFORMATION

This material, in its original state, is not harmful to the environment. Used activated carbon may exhibit characteristics of the adsorbed material.

13. DISPOSAL CONSIDERATIONS

In its original state, this product is not a hazardous material or hazardous waste. Follow applicable governmental regulations for waste disposal.
Used activated carbon may become classified as a hazardous waste depending upon the application. Follow applicable regulations for disposal.



14. TRANSPORT INFORMATION

DOT (Department of Transportation)

- Proper Shipping Name: • Carbon, Activated
- Hazard Class: • 4.2
- UN Number: • 1362
- Packing Group: • III
- Freight Classification: • STCC Code - #4916185 NMFC 040560

15. REGULATORY INFORMATION

FEDERAL REGULATIONS:

- OSHA Hazard Communication Standard, 29CFR1910.1200: • See "Particulates not otherwise regulated," in Table Z-1, of 29CFR1910.1000, "Limits For Air Contaminates".
- CERCLA/SUPERFUND, 40CFR117, 302: • Notification of spills of this material is not required.
- SARA/SUPERFUND: • Section 302 – Extremely hazardous substances (40CFR355): This product is not listed as an extremely hazardous substance.
• Section 313 – List of toxic chemicals: This product is not listed.
- Toxic Substances Control Act, 40CFR710: • This product is on the inventory list.
- Resource Conservation and Recovery Act: • This product, in its original state, does not meet the criteria of hazardous waste.

STATE REGULATIONS:

- California Occupational Safety and Health • Not listed.
- Massachusetts Substance List • Not listed.
- New Jersey Right-To-Know • Not listed.
- Pennsylvania Right-To-Know • Not listed.
- Pennsylvania Right-To-Know • Not listed.

WHMIS CLASSIFICATION:

- Not controlled.

16. OTHER INFORMATION

Activated carbon can be safely stored in any normal storage area, but away from sources of direct heat. **Storage at elevated temperatures or in direct sunlight may contribute to spontaneous combustion of this product.**

WARNING: Activated carbon (especially when wet) can deplete oxygen from the air, and dangerously low levels of oxygen may result. When workers enter a vessel containing activated carbon, procedures for potentially low oxygen areas should be followed.

This product is a self-heating substance (UN Manual of Tests and Criterion, Second Revised Edition. Test N.3.) Storage at high ambient temperature may exacerbate the self-heating tendency. Avoid high temperature and direct sunlight in storage.

REVISION SUMMARY:

REV 02: Added NORIT CAE and K150 to Section 1 Product names. Changed Marshall Plant telephone number. Minor wording changes to Sections 10, 13, and 14.

The information herein is given in good faith but no warranty, expressed or implied, is made.

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| ▶1. | Advanced wastewater treatment using Garland, C. F. | 1970 TD451.G3 | |
| ▶2. | Activated carbon Surface chemistry and Mattson, James S. | 1971 TP245.C4M3 | |
| ▶3. | Anaerobic-aerobic treatment of textile Palisades Industries. | 1973 TD172.E57 No.73-248 | |
| ▶4. | Mechanism of organic adsorption on Cookson, John T. | 1973 TD423 AIM3 No.17 | |
| ▶5. | Purification with activated carbon: Hassler, John W. | 1974 TP245.C4H34 1974 | |
| ▶6. | Removal of chromium from plating rinse Landrigan, Richard B. | 1975 TD172.E57 No.75-055 | |
| ▶7. | Process design manual for carbon Swindell-Dressler Co. | 197-] TD468.S9 | |
| ▶8. | Naval stores wastewater purification and Gardner, Frank H. | 1976 TD172.E57 No.76-227 | |
| ▶9. | Evaluation and upgrading of a multi-stage | 1976 TD172 E57 No.76-195 | |
| ▶10. | On-site production of activated carbon Del Bagno, V. D. | 1978 TD172.E57 No.78-191 | |
| ▶11. | Treatment of refinery wastewater using a McCrodden, Bruce A. | 1979 TD172.E57 No.79-066 | |
| ▶12. | Activated carbon process for treatment of Huang, C. P. | 1979 TD172.E57 No.79-130 | |
| ▶13. | Water treatment process modifications for Ohio River Valley Water Sanitation | 1980 TD172.E57 no.80-028 | |
| ▶14. | Cyanide removal from refinery wastewater Huff, James E. | 1980 TD172.E57 No.80-125 | |
| ▶15. | Preparation and evaluation of powdered Roberts, Paul V. | 1980 TD172.E57 No.80-123 | |
| ▶16. | Activated carbon adsorption of organics | c1980 TD449.5.A28 | |
| ▶17. | Humic substances removal by activated Lee, Michael C.-Y., | 1980 TC424.I314 no.153 | |



| | | | |
|------|--|----------------------------|--|
| ▶18. | The removal of low levels of phenol by Chudyk, Wayne A. | 1980 TC424.I3I4 no.154 | |
| ▶19. | Modeling of activated carbon and coal Thacker, William E. | 1981 TC424.I3I4 no. 161 | |
| ▶20. | Treatment of water by granular activated | 1983 381 Ad93 no.202 | |



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| ▶21. | Activated carbon adsorption for wastewater. | c1981 | |
| | | TD756.A28 | |
| ▶22. | Microbial attachment properties in | 1983 | |
| | Wang, Yi-Tin. | TC424.I3I4 no.181 | |
| ▶23. | Activated carbon adsorption of low | 1984 | |
| | | GB705 H3H3 no.166 | |
| ▶24. | Activated charcoal, 1953-1964; a list of | 1966 | |
| | Condon, Patricia Aten, | 1.916 L612 no. 82 | |
| ▶25. | Identification of active charcoals and | [1964] | |
| | Paulssen, Leif M. | TP245.C4P3 | |
| ▶26. | Aktivszén, muszén, korom | 1960 | |
| | Iványi, Gyula. | TP245.C4I8 | |
| ▶27. | Activated carbon used as electrodes in | 1969 | |
| | Murphy, G. W. | TN7.U5 no. 399 | |
| ▶28. | Adsorption of herbicides by activated | 1967 | |
| | Coffey, David L. | DISS 68-6,294 | |
| ▶29. | Activated charcoal, 1953-1964 : a list of | 1966 | |
| | Condon, Patricia A. | 1.916 L612 no.82 | |
| ▶30. | Herbicide safeners and activated carbon | 1985 | |
| | Andrade, Voni Anuniciacao de. | DISS 86-22,137 | |
| ▶31. | Proceedings / | c1987 | |
| | AWWA Seminar on Treatment Processes for | TD449.5.A99 1987 | |
| ▶32. | Selective sorption of gases in slurries of. | [1987?] | |
| | Tinge, Johan Thomas. | DISS F1987008 | |
| ▶33. | Technical report on manufacture of | 1985 | |
| | Taqi-ul-Hassan. | TD995.T37 | |
| ▶34. | Carbon adsorption handbook / | c1978 | |
| | | TP245 C4C35 | |
| ▶35. | Purification with activated carbon: | 1974 | |
| | Hassler, John W. | | |
| ▶36. | Determination of total organic chlorine | 1990 | |
| | Manninen, Pentti. | 385 H362 no.225 | |
| ▶37. | Drinking water and health / | 1980 | |
| | | RA591 D7 F&N B-2861-2-3 | |

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| | | | |
|------|---|-----------------------|--|
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Oregon Tilth Certified Organic

470 Lancaster Drive NE, Salem OR. 97301
(503) 378-0690, fax (503) 378-0809

Certification Acknowledgement

This is to Certify that

Canandaigua Concentrate

12667 Road 24, Madera, CA 93639
USA

has been certified organic by the Oregon Tilth Certification Program

Class OP Organic Food Processor

Certification Number CA-OTCO-CO-92-00018

Canandaigua Concentrate has complied with
the Oregon Tilth Standards and Guidelines Class OP.


The following products processed & sold during the stated year are:

Organic Products:

White Grape Juice Concentrate and Red Grape Juice Concentrate.

The company has been inspected during the stated year by an agent
of the OTCO program to verify that to the best of our knowledge the standards
and guidelines have been met.

Issue Date: 2-1-1992
Renewal Date: 1-31-2003


Pête Gonzalves
Executive Director

(K.)

FOURTH EDITION

**FOOD
CHEMICALS
CODEX**

Effective July 1, 1996

COMMITTEE ON FOOD CHEMICALS CODEX

**Food and Nutrition Board
Institute of Medicine
National Academy of Sciences**

**NATIONAL ACADEMY PRESS
Washington, D.C. 1996**

DESCRIPTION

solid, porous, carbonaceous material prepared by carbonizing and activating organic substances. The raw materials, which include sawdust, peat, lignite, coal, cellulose residues, coconut shells, petroleum coke, etc., may be carbonized and activated at a high temperature with or without the addition of inorganic salts in a stream of activating gases such as steam or carbon dioxide. Alternatively, carbonaceous matter may be treated with chemical activating agent such as phosphoric acid or zinc chloride and the mixture carbonized at an elevated temperature, followed by removal of the chemical activating agent by water washing. Activated Carbon occurs as a black, tasteless substance, varying in particle size from coarse granules to a fine powder. It is insoluble in water and in organic solvents.

Functional Use in Foods Decolorizing agent; taste- and odor-moving agent; purification agent in food processing.

REQUIREMENTS

Identification

A. Place about 3 g of powdered sample in a glass-stoppered Erlenmeyer flask containing 10 mL of dilute hydrochloric acid (5%), boil for 30 s, and cool to room temperature. Add 100 mL of iodine TS, stopper, and shake vigorously for 30 s. Filter through Whatman No. 12 filter paper, or equivalent, discarding the first portion of filtrate. Compare 50 mL of the subsequent filtrate with a reference solution prepared by diluting 10 mL of iodine TS to 50 mL with water, but not treated with carbon. The color of the carbon-treated iodine solution is no darker than that of the reference solution, indicating the adsorptivity of the sample.

B. Ignite a portion of the sample in air. Carbon monoxide and carbon dioxide are produced, and an ash remains.

Cyanogen Compounds Passes test.

Heavy Metals (as Pb) Not more than 0.004%.

Higher Aromatic Hydrocarbons Passes test.

Iodine Value Not less than 400.

Lead Not more than 10 mg/kg.

Water Extractables Not more than 4.0%.

The following additional REQUIREMENTS should conform to the representations of the vendor: **Loss on Drying and Residue on Ignition.**

TESTS

Cyanogen Compounds Mix 5 g of the sample with 50 mL of water and 2 g of tartaric acid, and distill the mixture, collecting 25 mL of distillate below the surface of a mixture of 2 mL of 0.1 N sodium hydroxide and 10 mL of water contained in a small flask placed in an ice bath. Dilute the distillate to 50 mL with water, and mix. Add 12 drops of ferrous sulfate TS to 25 mL of the diluted distillate, heat almost to boiling, cool, and add 1 mL of hydrochloric acid. No blue color is produced.

Heavy Metals A 10-mL portion of the filtrate obtained in the test for *Water Extractables* meets the requirements of the *Heavy Metals Test*, Appendix IIIB, using 20 µg of lead ion (Pb) in the control (*Solution A*).

Higher Aromatic Hydrocarbons Extract 1 g of the sample with 12 mL of cyclohexane in a continuous-extraction apparatus for 2 h. Using matched Nessler tubes, the extract shows no more color or fluorescence than does a solution of 100 µg of quinine sulfate in 1000 mL of 0.1 N sulfuric acid when observed under ultraviolet light.

Standard Iodine Solution Using a wide-mouth funnel, transfer 805 g of potassium iodide to a 2-L volumetric flask, and add enough water to the flask to cover the sample. Prepare a solution of 50 g of potassium iodide in 150 mL of water in a 250-mL beaker. Weigh 120 g of molecular iodine in a glass-stoppered weighing bottle. Pour the iodine into the funnel fitted to the 2-L volumetric flask, and then immediately restopper the weighing bottle, add an additional 285 g of potassium iodide to the funnel, and wash the funnel clean with a stream of water. With the potassium iodide solution, rinse the remaining iodine from the weighing bottle until the washings are colorless. Pour the remaining potassium iodide solution into the volumetric flask, and rinse all glassware with water into the volumetric flask. Grease the stopper, and insert it into the flask.

Gently shake the volumetric flask on a mechanical shaker for 30 min, add about 300 mL of water, and repeat the shaking until the flask has cooled to room temperature. Add progressively smaller amounts of water to the flask so that the final quantity required to dilute to volume is small enough that no further heat of solution is detectable. Allow the solution to stand overnight.

Transfer 100 mL of the iodine solution to a 1-L volumetric flask, and fill with water to the bottom of the flask neck. Allow the solution to stand 30 min before standardizing.

Standardization Transfer approximately 125 mg of primary standard-grade barium thiosulfate (dried at 40°), accurately weighed, to a 125-mL Erlenmeyer flask. Cover the sample with about 50 mL of starch TS, and continue the titration until 1 drop of iodine solution produces a distinct, light blue color. The normality (*N*) of the iodine solution, which is approximately 0.047, is given by $V \times 0.4673$, in which *V* is the volume, in mL, of titrant.

Procedure Transfer approximately 50 to 60 mg of sample, previously dried at 105° for 30 min and accurately weighed, to a glass vial or bottle. Pipet 25 mL of *Standard Iodine Solution*, stopper the container, and shake mechanically at about 240 strokes per min for 2 min. Transfer the mixture to a centrifuge tube, and centrifuge until the sample forms a pellet firm enough to permit decanting of the supernatant solution. Pipet 20 mL of the supernatant solution into a 250-mL Erlenmeyer flask, and titrate with sodium thiosulfate (*Volumetric Solutions, Solutions and Indicators*), diluted 1 in 2.5 with water, until the yellow iodine color becomes pale. Add 1 mL of starch TS, and continue titrating until the blue color is discharged. Record the volume of titrant as *S*. Titrate a 25-mL aliquot of *Standard Iodine Solution* with the sodium thiosulfate, and record the volume of titrant required as *B*.

Calculation Calculate the iodine value (*I*), in mg of iodine adsorbed per g of Carbon, by the formula

$$I = [N(B - S)(126.91)]/W,$$

in which (*B - S*) is the difference in volumes of sodium thiosulfate required for the blank and the sample, respectively; *N* is the exact normality of the sodium thiosulfate; and *W* is the weight, in g, of the sample.

Lead A 20-mL portion of the filtrate obtained in the test for *Water Extractables* meets the requirements of the *Lead Limit Test*, Appendix IIIB, using 10 µg of lead ion (Pb) in the control. **Loss on Drying**, Appendix IIC Dry at 120° for 4 h.

Residue on Ignition Ignite 500 mg as directed in the general method, Appendix IIC.

Water Extractables Transfer 5.00 g of the sample into a 250-mL flask provided with a reflux condenser and a Bunsen valve. Add 100 mL of water and several glass beads, and reflux for 1 h. Cool slightly, and filter through Whatman No. 12 or equivalent filter paper, discarding the first 10 mL of filtrate. Cool the subsequent filtrate to room temperature, and pipet 25.0 mL into a tared crystallization dish.

Note: Retain the remainder of the filtrate for the Heavy Metals and Lead tests.

Evaporate the filtrate in the dish to incipient dryness on a hot plate, never allowing the solution to boil. Dry for 1 h at 100° in a vacuum oven, cool, and weigh.

Packaging and Storage Store in well-closed containers.