



CAIROX® POTASSIUM PERMANGANATE FREE-FLOWING GRADE DATA SHEET

Free-Flowing Grade is recommended where potassium permanganate is subjected to high humidity conditions and where the material is to be dry fed through a chemical feeder or stored in a bin or hopper.

FREE-FLOWING GRADE

Assay

Guaranteed 97% KMnO₄

Particle Size

20% maximum retained on #425 U.S. Standard Sieve
(formerly #40)

7% maximum through #75 U.S. Standard Sieve
(formerly #200)

Standards and Specifications

CAIROX® Potassium Permanganate is certified by the National Sanitation Foundation (NSF) to ANSI/NSF Standard 60: Drinking Water Treatment Chemicals - Health Effects.

Free-Flowing Grade Meets:

AWWA Standard B603

Military Specifications MIL-P-11970-C dated 14 October 1983
Water Chemical Codex RMIC Values

CHEMICAL/PHYSICAL DATA

Formula KMnO₄

Formula Weight 158.0 g/mol

Form Granular Crystalline

Specific Gravity

Solid 2.703 g/cm³

3% Solution 1.020 g/mL by weight, 20°C / 4°C

Bulk Density Approximately 100 lb/ft³

Decomposition may start at 150 °C / 302 °F

SOLUBILITY IN DISTILLED WATER

Temperature		Solubility	
°C	°F	g/L	oz/gal
0	32	27.8	3.7
20	68	65.0	8.6
40	104	125.2	16.7
60	140	230.0	30.7
70	158	286.4	38.3
75	167	323.5	43.2

SHIPPING CONTAINERS

25 kg pail⁽¹⁾ (55.125 lb) net, with handle, made of HDPE, weighs 3.1 lbs. It is tapered to allow nested storage of empty drums, stands approximately 15.5 inches high and has a maximum diameter of 12 inches.

150 kg drum⁽¹⁾ (330.750 lb) net, made of 22-gauge steel, weighs 22.4 lbs. It stands approximately 29.5 inches high and is approximately 19.75 inches in diameter.

1500 kg CYCLE BIN™⁽²⁾ reusable container (3307 lb) net

Bulk, up to 48,000 lbs

Special Packages will be considered on request.

(1) Meets UN performance oriented packaging requirements.

(2) The CYCLE BIN meets DOT 56 Specifications.

DESCRIPTION

Crystals or granules are dark purple with a metallic sheen, sometimes with a dark bronze-like appearance. Potassium permanganate has a sweetish, astringent taste and is odorless.

HANDLING, STORAGE, AND INCOMPATIBILITY

Protect containers against physical damage. When handling potassium permanganate, respirators should be worn to avoid irritation of or damage to mucous membranes. Eye protection should also be worn when handling potassium permanganate as a solid or in solution.

Potassium permanganate is stable and will keep indefinitely if stored in a cool, dry area in closed containers. Concrete floors are preferred to wooden decks. To clean up spills and leaks, follow the steps recommended in the MSDS. Be sure to use goggles, rubber gloves, and respirator when cleaning up a spill or leak.

Avoid contact with acids, peroxides, and all combustible organic or readily oxidizable materials including inorganic oxidizable materials and metal powders. With hydrochloric acid, chlorine gas is liberated. Potassium permanganate is not combustible, but will support combustion. It may decompose if exposed to intense heat. Fires may be controlled and extinguished by using large quantities of water. Refer to the MSDS for more information.



CORROSIVE PROPERTIES

CAIROX® Potassium Permanganate is compatible with many metals and synthetic materials. Natural rubbers and fibers are often incompatible. Solution pH and temperature are also important factors. The material must be compatible with either the acid or alkali also being used.

In neutral and alkaline solutions, potassium permanganate is not corrosive to iron, mild steel, or stainless steel; however, chloride corrosion of metals may be accelerated when an oxidant such as permanganate is present in solution. Plastics such as polypropylene, polyvinyl chloride Type I (PVC I), epoxy resins, fiberglass reinforced plastic (FRP), Penton, Lucite, Viton A, and Hypalon are suitable. Teflon FEP and TFE, and Tefzel ETFE are best. *Refer to Material Compatibility Chart.*

Aluminum, zinc, copper, lead, and alloys containing these metals may be (slightly) affected by potassium permanganate solutions. Actual studies should be made under the conditions in which permanganate will be used.

SHIPPING

Potassium permanganate is classified by the Hazardous Materials Transportation Board (HMTB) as an oxidizer. It is shipped under Interstate Commerce Commission's (ICC) Tariff 19.

Proper Shipping Name: Potassium Permanganate (RQ-100/45.4)

Hazard Class: Oxidizer

Identification Number: UN 1490

Label Requirements: Oxidizer

Packaging Requirements: 49 CFR Parts 100 to 199,

Sections: 173.152, 173.153, 173.194

Shipping Limitations:

Minimum quantities:

Rail car: See Tariff for destination

Truck: No minimum

Postal regulations:

Information applicable to packaging of oxidizers for shipment by the U.S. Postal Service to domestic and foreign destinations is readily available from the local postmaster. United Parcel Service accepts 25 lbs as largest unit quantity properly packaged; consult United Parcel Service. Regulations concerning shipping and packing should be consulted regularly due to frequent changes.

REPACKING

When potassium permanganate is repacked, the packing, markings, labels, and shipping conditions must meet applicable Federal regulations. See Code of Federal Regulations-49, Transportation (parts 100-199) and Federal Hazardous Materials Substances Act, 15 U.S.C. 1261.

APPLICATIONS

Listed below are some of the many applications of potassium permanganate. Permanganate is a powerful oxidizing agent. The optimum condition under which it is to be used can be easily established through technical service evaluations or laboratory testing.

Oxidation and Synthesis - Organic chemicals and intermediates manufacture. Oxidizes impurities in organic and inorganic chemicals.

Water Treatment - Oxidizes iron, manganese, and hydrogen sulfide; controls taste and odor; and is an alternate pre-oxidant for Disinfection By-Product (THMs and HAAs) control.

Municipal Wastewater Treatment - Destroys hydrogen sulfide in wastewater and sludge. Improves sludge dewatering.

Industrial Wastewater Treatment - Oxidizes hydrogen sulfide, phenols, iron, manganese, and many other organic and inorganic contaminants; resultant manganese dioxide aids in removing heavy metals.

Metal Surface Treatment - Conditions mill scale and smut to facilitate subsequent removal by acid pickling in wrought metals manufacturing and jet engine cleaning.

Equipment Cleaning - Assists in cleaning organic and inorganic residues from refining and cooling towers and other processing equipment. Decontaminates hydrogen sulfides, pyrophoric iron sulfides, phenols, and others.

Purification of Gases - Removes trace impurities of sulfur, arsine, phosphine, silane, borane, and sulfides from carbon dioxide and other industrial gases.

Mining and Metallurgical - Aids in separation of molybdenum from copper; removes impurities from zinc and cadmium; oxidizes flotation compounds. Removes iron and manganese from acid mine drainage.

Slag Quenching - Controls hydrogen sulfide and acetylene emissions during quenching of hot slag.

Food Processing - Controls sulfides, soluble animal oil, grease, organic acids, ketones, nitrogen compounds, mercaptans, and BOD.