I'm not a bot

health centershealth & living center Although phosphoric acid is generally regarded as safe, excessive phosphorus intake can cause harm to your heart, kidneys, and bones According to the U.S. Food and Drug Administration (FDA), phosphoric acid is generally regarded as safe (GRAS). However, excessive phosphorus intake can cause harm to your heart, kidneys, and bones. Phosphoric acid or phosphate salt occurs naturally in foods such as beans, meat, chicken, eggs, and fish, and your body needs about 700 mg of phosphorus per day. However, it is more common to have too much of this mineral than not enough, since most people get enough in their diet. Phosphoric acid is often used as an additive in processed foods and soda, meaning that consumption of these items can lead to too much phosphorus in the body. Phosphoric acid or orthophosphoric acid is a colorless, odorless crystalline liquid. The mineral phosphorus, which occurs naturally in the body, is used to create phosphoric acid. Phosphorus first undergoes a chemical transformation to become phosphorus pentoxide. Then, it is treated againto form phosphoric acid. It supports the way the body consumes and stores energy and kidney function. After a strenuous workout, phosphorus also aids in muscle recovery. Phosphoric acid imparts tartness to soft drinks and inhibits the growth of mold and germs, which can quickly proliferate in a sweet environment. Phosphoric acid is a major source of acidity in soda. According to studies, consuming too much phosphorus increases your chances of developing osteoporosis and heart disease. Together, calcium and phosphorus help build and maintain strong teeth and bones. To be effective, however, the minerals need to be balanced. Potential health risks of phosphoric acid include the following: 1. Decreased bone density Phosphoric acid can lead to a decrease in bone density. One study on teenage girls reported a link between high phosphorus intake and a higher rate of bone fractures. 2. Kidney problems Kidney stones, chronic kidney disease, and urine changes have been linked to the consumption of cola drinks high in phosphoric acid. Excessive amounts of phosphoric acid can be hard on the kidneys, especially for people who have underlying kidney issues. In a study that compared the dietary habits of 467 healthy people and 465 people, consumption of two or more regular or diet sodas, which are high in phosphoric acid, was linked to a doubled risk of chronic kidney disease. 3. Vitamin deficiencies Calcium levels can drop if you consume too much phosphorus, and research has linked drinking daily cola consumption to hypocalcemia. Phosphorus overload can impede your body's ability to use essential nutrients properly, such as iron, magnesium, and zinc, and these vitamin deficiencies can cause a variety of other health issues. 4. Toxic exposure Phosphoric acid is a chemical substance that is often found in detergents and disinfectants. When it comes into contact with the skin and eyes, it can cause irritation and burning. When inhaled, it can irritate the nose, throat, and lungs, which can cause coughing and wheezing. Since soft drinks are often high in phosphoric acid, it is best to limit your intake or find alternative beverages. Read labels carefully, since many processed foods contain phosphoric acid as well. Foods That Aren't as Healthy as You Think See Slideshow Image Source: iStock image U.S. Food and Drug Administration. CFR - Code of Federal Regulations Title 21. National Institutes of Health. Phosphorus. International Food Additives Council. Sources of Food Ingredients: Phosphoric Acid. New Jersey Department of Health and Senior Services. Phosphoric Acid. Wyshak G. Teenaged girls, carbonated beverage consumption, and bone fractures. Arch Pediatr Adolesc Med. 2000 Jun;154(6):610-3. Saldana TM, Basso O, Darden R, Sandler DP. Carbonated beverages and chronic kidney disease. Epidemiology. 2007 Jul;18(4):501-6. Guarnotta V, Riela S, Massaro M, et al. The Daily Consumption of Cola Can Determine Hypocalcemia: A Case Report of Postsurgical Hypoparathyroidism-Related Hypocalcemia Refractory to Supplemental Therapy with High Doses of Oral Calcium. Front Endocrinol (Lausanne). 2017 Jan 26;8:7. Please enable Javascript in order to use PubChem website. Phosphoric acid (also known as orthophosphoric acid or phosphoric [V] acid) Molecular formula : H3PO4 (O = 65,3 %, P = 31,64%, H = 3,06 %) Molar mass = 97,9952 0,0014 gmol-1 Phosphoric acid is a mineral (inorganic) acid . Orthophosphoric acid molecules can combine with themselves to form a variety of compounds which are also referred to as phosphoric acids, but in a more general way. The term phosphoric acid can also refer to a chemical or reagent consisting of phosphoric acids, such as pyrophosphoric acid or triphosphoric acid, but usually orthophosphoric acid. The conjugate base of phosphoric acid is the dihydrogen phosphate ion, H2PO4-, which in turn has a conjugate base of hydrogen phosphate, HPO42-, which has a conjugate base of phosphate, PO43-. The most common source of phosphoric acid is an 85% aqueous solution; such solutions are colourless, odourless, and non-volatile. Rather viscous, syrupy liquids, but still pourable. Because it is a concentrated acid, an 85% solution can be corrosive, although nontoxic when diluted. Because of the high percentage of phosphoric acid in this reagent, at least some of the orthophosphoric acid is condensed into polyphosphoric acids. For the sake of labeling and simplicity, the 85% represents H3PO4 as if it were all orthophosphoric acid. Dilute aqueous solutions of phosphoric acid exist in the ortho- form. Preparation. Phosphoric acid can be prepared by three routes : the wet process, which includes two sub-methods, the thermal process. The more expensive thermal process produces a purer product that is used for applications in the food industry. The wet process dominates in the commercial sector. Wet process phosphoric acid is prepared by adding sulfuric acid H2SO4 to tricalcium phosphate rock Ca5(PO4)3F, typically found in nature as apatite. The reaction is: Ca5(PO4)3X + 5 H2SO4 + 10 H2O >>> 3 H3PO4 + 5 CaSO42 H2O + HX where X may include OH, F, Cl, and Br. Digestion of the phosphate ore using sulfuric acid yields the insoluble calcium sulfate (gypsum, CaSO4.2H2O), which is filtered and removed as phosphogypsum or hemihydrate CaSO4 .1/2 H2O. Wet-process acid can be further purified by removing fluorine to produce animal-grade phosphoric acid, or by solvent extraction and arsenic removal to produce food-grade phosphoric acid. The nitrophosphate process is similar to the wet process except that it uses nitric acid in place of sulfuric acid. The advantage to this route is that the coproduct, calcium nitrate is also a plant fertilizer. This method is rarely employed. Thermal process. Very pure phosphoric acid is obtained by burning elemental phosphorus to produce phosphorus pentoxide P4O10 (empirical formula, P2O5), which is subsequently dissolved in dilute phosphoric acid. This route produces a very pure phosphoric acid, since most impurities present in the rock have been removed when extracting phosphorus from the rock in a furnace. The end result is food-grade, thermal phosphoric acid; however, for critical applications, additional processing to remove arsenic compounds may be needed. Elemental phosphorus is produced by an electric furnace. At a high temperature, a mixture of phosphate ore, silica and carbonaceous material (coke, coal etc...) produces calcium silicate, phosphorus gas P and carbon monoxide CO. The P and CO off-gases from this reaction are cooled under water to isolate solid phosphorus. Alternatively, the P and CO off-gases can be burned with air to produce phosphorus pentoxide and carbon dioxide CO2. Main properties. At room temperature, phosphoric acid is a crystalline solid density 1.834, melting point at 42.35 C > colorless viscous liquid. Pur is a hygroscopic solid (deliquescent). The pure acid is not commercially available. Product Density 1.885 g/mL (liquid) 1.685 g/mL (85% solution) Melting point 42.35 C (108.23 F) (anhydrous) 29.32 C (84.78 F) (hemihydrate) Boiling point (decomposition) 158 C (316 F; 431 K) Solubility 392.2 g/100 mL (-16.3 C) 369.5 g/100 mL (0.5 C) 5.48 g/mL (20 C) miscible (42.3 C) Viscosity 2.49.4 cP (85% aq. soln.) 147 cP (100%) The oxidation state of phosphorus (P) in ortho- and other phosphoric acids is +5; the oxidation state of all the oxygen atoms (O) is -2 and all the hydrogen atoms (H) is +1. Triprotic means that an orthophosphoric acid molecule can dissociate up to three times, giving up an H+ each time, which typically combines with a water molecule, H2O, as shown in these reactions: H3PO4 (s) + H2O(l) >>> H2PO4-(aq) + H3O+(aq), Ka1= 7,2510-3, pKa1 = 2,12 H2PO4-(aq) + H2O(l) >>> HPO42-(aq) + H3O+(aq), Ka2= 6,3110-8, pKa2= 7,21 HPO42-(aq) + H2O(l) >>> PO43-(aq) + H3O+(aq), Ka3= 3,9810-13, pKa3= 12,67 For each of the dissociation reactions shown above, there is a separate acid dissociation constant, called Ka1, Ka2, and Ka3 given at 25 C. Aqueous solution. For a given total acid concentration [A] = [H3PO4] + [H2PO4-] + [HPO42-] + [PO43-]; ([A] is the total number of moles of pure H3PO4 which have been used to prepare 1 liter of solution), the composition of an aqueous solution of phosphoric acid can be calculated using the equilibrium equations associated with the three reactions described above together with the [H+] [OH-] = 10-14 relation and the electrical neutrality equation. Possible concentrations of polyphosphoric molecules and ions is neglected. The system may be reduced to a fifth degree equation for [H+] which can be solved numerically, yielding: For strong acid concentrations, the solution is mainly composed of H3PO4. For [A] = 10-2, the pH is close to pKa1, giving an equimolar mixture of H3PO4 and H2PO4-. For [A] below 10-3, the solution is mainly composed of H2PO4- with [HPO42-] becoming non negligible for very dilute solutions. [PO43-] is always negligible. Since this analysis does not take into account ion activity coefficients, the pH and molarity of a real phosphoric acid solution may deviate substantially from the above values. In water treatment, it is used by injection in the form of water diluted reagent (solutions). A formulation for the water treatment. Reaction mechanism of calcium bicarbonates (simplified equations): .....2H3PO4 +.....3Ca[HCO3]2 . ..... >>>.... .....6 CO2 .....+ 6H2O.... +Ca3[PO4]2 (98x2=196)..... (162x3 or 30F or 300 mg/L as CaCO3) .....(6x44=264) ..... With 1 mg as H3PO4 added, there has (30/98x2) = 0.15F for lower TAC (Alkalinity), and 1.347 mg as free CO2 and 0.97 mg/l as PO4 formed. Storage. A entreposer dans un rcipient tenu ferm, portant une identification claire de son contenu, plac dans un endroit frais, sec et bien ventil, l'abri des bases, des matires combustibles. Uses. (Phosphoric acid and its derivatives are pervasive and find many niche applications) The dominant use of phosphoric acid is for fertilizers, consuming approximately 90% of production.[wastewater treatment and industrial water Phosphoric acid may be used to remove rust by direct application to rusted iron, steel tools, or other surfaces. The phosphoric acid changes the reddish-brown iron(III) oxide, Fe2O3 (rust) to ferric phosphate, FePO4. In medicine: Phosphoric acid is used in dentistry and orthodontics as an etching solution, to clean and roughen the surfaces of teeth where dental appliances or fillings will be placed. Phosphoric acid is also an ingredient in over-the-counter anti-nausea medications that also contain high levels of sugar (glucose and fructose). This acid is also used in many teeth whiteners to eliminate plaque that may be on the teeth before application. Health-wise. It can cause severe burns. In soft drinks : Phosphoric acid, used in many soft drinks (primarily cola), has been linked in epidemiological studies to chronic kidney disease and lower bone density. Toxicological profile (French) - Acide phosphorique (FT 37) par l'Institut national de recherche et de scurit (INRS). Also, see NIOSH Pocket guide to chemical hazards (The National Institute for Occupational Safety and Health - US). Sources : personal and Wikipedia, the free encyclopedia. (use your browser) This article is the first in a two-part series that provides an overview of some important industry and regulatory compliance issues you should be aware of when purchasing a chemical storage tank. This series doesnt cover an all-inclusive list of compliance regulations, but you can use the articles to give you a confident start in understanding the requirements to consider when purchasing a chemical storage tank. Topics: News and Customer Stories, Tank Design and Materials Designing a Poly Processing chemical storage solution always begins with a thorough understanding of the chemical being stored. To design and recommend a safe, cost-effective chemical storage system, it's critical for our tank experts to ask the right questions and do the right research. This ensures that we properly understand the makeup of your chemicals and the potential reactions to various storage solutions. Topics: Value Added One of the challenges in storing any oxidizing chemical is engineering a chemical storage tank that not only contains the chemical but has a greater useful life and measure of safety. Whether youre storing sodium hypochlorite, sulfuric acid, hydrochloric acid, or other oxidizing substances, it is critical to design the storage tank with the chemical in mind. Topics: Tank Design and Materials, FAQs In industries where chemical storage is essential, selecting the right tank size and system is critical. An incorrect choice can lead to regulatory penalties, safety hazards, and financial losses. This article will guide you through the process of determining the ideal tank size for your chemical storage needs, while outlining the considerations for capacity, material, safety, and compliance. Topics: Value Added For over five decades, Poly Processing has been at the forefront of innovation in chemical storage tank design and manufacturing. Reinforcing our commitment to advancing crosslinked polyethylene (XLPE) tank technology, we are thrilled to unveil our latest update to our storage tank solutions: the 15,500-gallon IMFO tank, the 15,000-gallon Sloped Bottom IMFO tank, and the 15,500-gallon Vertical tank, are all available in specific gravities up to 2.2 design. These large innovative XLPE tanks are designed for exceptional durability, reliable performance, and an extended lifespan across a variety of applications. To enhance protection and prolong service life in oxidative environments, such as those involving sodium hypochlorite, they can be manufactured with our industry-leading OR-1000 engineered resin system, known for its remarkable resistance to oxidative chemicals. These tanks represent the best engineering and design in the tank manufacturing industry, and they are covered under PPCs industry-leading warranty. At Poly Processing, were focused on delivering high-quality, forward-thinking solutions to meet the evolving demands of the chemical storage industry. Topics: Fittings and Accessories, Applications When youre storing hazardous fluids such as corrosive acids, bases, or aggressively oxidizing chemicals, you need to be confident that your chemical storage tank can meet your expectations for many years. You cant afford to invest in chemical tanks, only to discover later that your chemical storage tank isnt compatible with the chemicals youre using. Thats a loss of product, time, and moneyand it could put your people, equipment, and environment at risk, as well. Topics: Value Added Cone-bottom tanks are generally used in process applications where total drainage of the tank is required. Typical applications would include the storage of heavy materials and materials prone to sludging, which are difficult to drain out of upright tanks. Cone-bottom tanks are also ideal for dry materials, such as grains or cattle feed as they can be 100% drained out of the tank with a flange or slidegate at the bottom of the tank. In addition, materials that require separation can be handled with a decant fitting to remove the liquid from the solids. Lets take a look at some key considerations for evaluating cone-bottom tank storage solutions and attractive alternatives. Topics: Applications When a chemical storage tank fails, the costs can be significant to your organization. Regulatory concerns, environmental cleanup, property damage, and injury to employees can be costly exposures. Lets take a look at a few of the reasons chemical storage tanks fail. Topics: Fittings and Accessories If youre storing hazardous materials, secondary containment systems can prevent costly damage to equipment as well as physical risk to employees if a primary storage vessel is breached. There are several secondary containment options with varying costs, and concrete containment is a popular industry standard. But you may be surprised when you compare the true costs of a poured-in-place concrete system to Poly Processings sophisticated integrated double-wall tank containment system, the SAFE-Tank. Topics: Applications If you're storing chemicals that emit fumes such as hydrochloric acid or hydrogen peroxide, you need to have a proper venting system in place. We've developed The PolyScrub fume scrubber to help you ensure the safety of your employees, equipment, and the environment. Topics: Fittings and Accessories Get the MedicineNet Daily newsletter for health tips, wellness updates and more. By clicking "Subscribe Now", I agree to the MedicineNet Terms and Conditions and Privacy Policy. I also agree to receive emails from MedicineNet and I understand that I may opt out of MedicineNet subscriptions at any time. How can financial brands set themselves apart through visual storytelling? Our experts explainhow.Learn MoreThe Motorsport Images Collections captures events from 1895 to todays most recentcoverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of EditorsPicks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? 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To ensure we keep this website safe, please can you confirm you are a human by ticking the box below. If you are unable to complete the above request please contact us using the below link, providing a screenshot of your experience. Phosphoric acid (HPO), a vital compound in various industrial and chemical applications, is widely known for its use in fertilizers, food additives, and cleaning agents. However, like many other substances, it exhibits a range of chemical behaviors when exposed to extreme conditions such as high temperatures, high pressures, or reactive environments. Understanding its decomposition under such conditions is crucial for its safe handling and for optimizing its industrial uses. 1. Phosphoric Acid: Basic Properties Phosphoric acid is a mineral acid with the chemical formula HPO. It is commonly encountered in aqueous solutions and exists as a colorless, odorless liquid or a crystalline solid. It is a weak acid, which means it does not completely dissociate in water. In its solid form, it is a hygroscopic substance, readily absorbing moisture from the atmosphere. Phosphoric acid is often used in the production of fertilizers (particularly superphosphate), detergents, and as an acidulant in the food industry. It also has significant applications in metal treatment, where its ability to clean and etch metal surfaces is utilized. 2. Decomposition of Phosphoric Acid Under High Temperature The decomposition of phosphoric acid primarily involves the release of water and the formation of other phosphorous compounds. When exposed to elevated temperatures, phosphoric acid undergoes a series of thermal decomposition reactions, leading to the formation of polyphosphoric acids, phosphorus pentoxide (PO), and other phosphorus oxides. At temperatures above 200C, phosphoric acid starts to lose water, resulting in the formation of pyrophosphoric acid (HPO) and eventually, at higher temperatures, the formation of phosphorus pentoxide (PO). Phosphorus pentoxide (PO) is a highly reactive compound, commonly used as a dehydrating agent. The formation of PO is an irreversible process and marks the end of the decomposition under extreme heat conditions. 3. Decomposition Under High Pressure Under high-pressure conditions, phosphoric acid may undergo different reaction pathways. Pressure can influence the rate of dehydration and the formation of polyphosphoric acids. When phosphoric acid is subjected to extreme pressures, such as those found in industrial reactors or in deep geological conditions, it can form condensed polyphosphates. The higher the pressure, the greater the tendency for the acid to polymerize and form these higher-order phosphates. The decomposition under high pressure tends to occur more slowly than under high temperature, as the increased pressure can stabilize the phosphoric acid molecules, slowing the rate of water loss. However, under very high pressures, such as those exceeding 1 GPa, the decomposition behavior of phosphoric acid may change entirely, potentially leading to the formation of more complex phosphorus species. 4. Reaction in Reactive Environments In addition to temperature and pressure, phosphoric acid can decompose under reactive conditions, particularly when exposed to strong oxidizing agents or reactive metals. Under such conditions, phosphoric acid can break down into volatile phosphorus oxides and release toxic fumes such as phosphorus trichloride (PCl), phosphorus oxychloride (POCl), and other harmful compounds. The presence of halogens or strong bases can further promote the decomposition, leading to more aggressive reactions. Phosphoric acid is often used in industrial processes where it reacts with metals, particularly in pickling and etching. The reaction of phosphoric acid with metals like iron can result in the formation of metal phosphates and the release of hydrogen gas, a potential safety hazard under certain conditions. 5. Safety and Handling Considerations Due to the highly reactive nature of the decomposition products of phosphoric acid, especially at high temperatures and pressures, it is essential to handle phosphoric acid with care in industrial settings. Adequate ventilation is necessary to prevent the accumulation of harmful phosphorus oxides in the air. Additionally, proper safety protocols should be followed when dealing with phosphorus pentoxide and other decomposition products, as these compounds are not only corrosive but also toxic. Industries utilizing phosphoric acid should ensure that their equipment can withstand the extreme conditions necessary for its decomposition. Regular maintenance and monitoring of temperature and pressure are critical in preventing accidents during chemical reactions involving phosphoric acid. 6. Applications of Phosphoric Acid Decomposition The decomposition of phosphoric acid under extreme conditions is utilized in several applications, particularly in the production of phosphorus-containing compounds like phosphorus pentoxide. These compounds are used as dehydrating agents in a variety of industrial processes, including the production of phosphoric esters and as catalysts in organic synthesis. Additionally, the controlled decomposition of phosphoric acid is essential in the manufacture of high-purity phosphates and polyphosphates, which are crucial in the fertilizer industry. Understanding how phosphoric acid behaves under extreme conditions is key to optimizing these processes and ensuring the safety and efficiency of industrial operations. 7. Conclusion Phosphoric acid, while stable under standard conditions, undergoes significant changes when exposed to extreme conditions such as high temperature, pressure, and reactive environments. Its decomposition leads to the formation of various phosphorus compounds, including phosphorus pentoxide, polyphosphoric acids, and other phosphorus oxides. These reactions have both industrial and safety implications, making it essential to understand the conditions under which phosphoric acid decomposes. Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Main page (Russian) Search in database (English) orthophosphoric acidinorganiccolorless monoclinic crystalsH3O4PH3PO442.35213diethyl ether: 525 (20C) [Ref.]ethanol: soluble [Ref.]water: 329.2 (-16.3C) [Ref.]water: 369.5 (0.5C) [Ref.]water: 548 (20C) [Ref.]water: 599.3 (24.03C) [Ref.]water: miscible (42.3C) [Ref.]10% (wt.), solvent - waterViscosity (mPas) = 1.1 (25)Density (g/cm3) = 1.05223 (25)Freezing point (C) = -2.1Boiling point (C) = 100.220% (wt.), solvent - waterDensity (g/cm3) = 1.1129 (25)30% (wt.), solvent - waterDensity (g/cm3) = 1.1794 (25)40% (wt.), solvent - waterDynamic viscosity (mPas) = 3.856 (20)Density (g/cm3) = 1.2536 (20)Density (g/cm3) = 1.2527 (25)Index of refraction = 1.3735 (20)Freezing point (C) = -23.5850% (wt.), solvent - waterDensity (g/cm3) = 1.3334 (25)Freezing point (C) = -41.9Boiling point (C) = 104.60% (wt.), solvent - waterViscosity (mPas) = 9.2 (25)Density (g/cm3) = 1.4223 (25)Freezing point (C) = -76.9Boiling point (C) = 114.962,5% (wt.), solvent - waterFreezing point (C) = -85.70% (wt.), solvent - waterViscosity (mPas) = 15.4 (25)Density (g/cm3) = 1.52 (25)Freezing point (C) = -43.80% (wt.), solvent - waterDensity (g/cm3) = 1.6275 (25)Freezing point (C) = -4.690% (wt.), solvent - waterFreezing point (C) = 28.8very hygroscopicInteratomic distances (in pm): 157 (P-OH)Interatomic distances (in pm): 152 (P=O)Year of discovery: 1671Electrical Conductivity (mS/cm): 46.81.87 (20C, g/cm3) [Ref.1]2H3PO4 H4P2O7 + H2O [Ref.1]KI + H3PO4 HI + KH2PO4 [Ref.1]2H3PO4 + P2O5 + H2O 2H4P2O7H0 (1) = -5.2 (25C)pKBH+ (1) = -3 (25C, water)pKa (1) = 2.12 (25C, water)pKa (1) = 4.4 (25C, acetic acid)pKa (2) = 7.2 (25C, water)pKa (3) = 11.9 (25C, water)61 (25C)76.5 (45C)177.7 (25C)-1279 (s)-1119.1 (s)110.5 (s)106.1 (s)13-1271.7 (l)-1123.6 (l)150.8 (l)145 (l)1250 (rats, oral)1250 (mice, oral)CRC Handbook of Chemistry and Physics. - 90ed. - CRC Press, 2010. - pp. 5-13Comey A. M., Hahn D. A. A dictionary of Chemical Solubilities Inorganic. - 2 ed. - New York, The MacMillan Company, 1921. - pp. 672-674Holleman A.F., Wiberg E., Wiberg N. Lehrbuch der Anorganischen Chemie. - Berlin: Walter de Gruyter, 1995. - pp. 238Inorganic Syntheses. - Vol. 1. - New York and London, 1939. - pp. 101-103Seidell A. Solubilities of inorganic and metal organic compounds. - 3ed., vol.1. - New York: D. Van Nostrand Company, 1940. - pp. 592-594Seidell A. Solubilities of inorganic and metal organic compounds. - 3ed., vol.1. - New York: D. Van Nostrand Company, 1940. - pp. 592-594 : , . - 7- ., .3. - .: , 1976. - pp. 132-133 [Russian] : V-VIII . . - ., 1989. - pp. 73 [Russian] .. . - .: , 1979. - pp. 91 [Russian] .. . - .1. - .: , 1973. - pp. 449 [Russian] .. . . - .: , 1970 [Russian] .., .. . - .: , 1977. - pp. 109, 219 [Russian] . - .1, .1. - .-.: , 1961. - pp. 332, 926 [Russian] . - . 3. - .-.: , 1965. - pp. 118 [Russian] . - . 5. - .: , 1999. - pp. 153-156 [Russian] Your requests if no data into database Collected Ruslan Anatolievich Kiper, burewestnik@mail.ruPhosphoric acid is one of the top ten chemicals used in the United States. Phosphates have many uses in the treatment of drinking water. Food grade phosphoric acid is common in the food industry, and its even used in pharmaceuticals, detergents, and textile pigments. Because of its ubiquity and its corrosive qualities, this is an acid that must be handled properly. Any chemical storage solution that contains phosphoric acid must be specifically engineered to handle the chemical properties of this substance.Lets look at the use of phosphoric acid in water treatment and the challenges of storing this chemical.Uses of Phosphoric Acid in Water TreatmentWater treatment plants use phosphoric acid to prevent the after effects of groundwater exposure to iron and manganese, better known as "red water" (from iron) and "black water" (from manganese). When iron and manganese are exposed to air, they oxidize and discolor the water. This creates rust stains from the iron, or brownish-black stains from the manganese. You can sometimes find these stains around bathtub drains or in the laundry.Often, water treatment facilities use phosphoric acid to prevent or reduce scale formation (from minerals depositing) and corrosion (from low pH and/or dissimilar metals) in the water distribution system.The chemical can also help reduce soluble lead and copper in tap water. Leaching of pipes and plumbing fixtures results in deposits of lead and copper in drinking water, and phosphates significantly reduce the presence of lead and copper.Phosphoric Acid Storage Challenges and SolutionsPhosphoric acid is highly corrosive and can form hazardous decomposition products. Contact with certain metals can produce flammable hydrogen gas.Proper handling isnt just a best practice its essential to the health and safety of your personnel. Always avoid skin contact and eye contact. Store phosphoric acid in a ventilated area and ensure that personnel are wearing personal protective equipment, including face shields.Phosphoric acid is delivered at elevated temperatures to keep the chemicals from separating. This causes expansion and contraction stress on the storage tank due to temperature variations. A robust, high density cross linked polyethylene (XLPE) storage tank is required to handle this kind of tank stress.Crosslinking is simply the formation of bonds between the polymer chains. These bonds are equal in strength and stability to the principal bonds along the polymer backbone. They tie the polymers together, dramatically increasing molecular weight. In fact, the length of the polymer chains and, therefore, the physical properties, is much better than can ever be achieved without crosslinking.The result is a plastic that possesses impact resistance, tensile strength, and resistance to fracture that linear polyethylene just cant match. These qualities make cross-linked polyethylene an excellent choice when tank integrity is critical. The structural integrity, heat resistance, and useful life in most cases are unparalleled.Since phosphoric acid has a tendency to separate, sludge builds up at the bottom of the storage tank. Poly Processings IMFO system provides full tank discharge and one-piece construction using high-density cross-linked polyethylene. This gives you the benefit of easy and safe tank cleaning, as well as the robust tank material required to handle phosphoric acid.Strength and Durability: Linear Vs. Cross-Linked PolyethyleneBoth polyethylene resins are rotational molding-grade resins that have been ground into a powder to allow the material to melt easily during the molding process. Both resins are available in standard colors as well as some custom colors. Both resins are corrosion-resistant polyethylene.However, the differences are critical. Compared to linear polyethylene, XLPE provides:10 - 20 times the environmental stress crack resistance10 times the molecular weight3-5 times the impact and tensile strengthThe four most important factors of high-density linear tanks and cross-linked tanks include:Environmental stress crack resistance/notch sensitivityLong-term hydrostatic strengthToughness and DurabilityUseful LifeIn all four of these areas, factual testing and measurements show cross-linked resins are more durable than linear resins.What About Stainless Steel Tanks for Phosphoric Acid?Many facilities choose to store phosphoric acid in stainless steel chemical storage tanks. On one hand, steel tanks provide several benefits:Steel side walls are resistant to corrosion.Steel tanks can be stored indoors or outdoors.Steel tanks are easy to regulate temperature.On the other hand, steel tanks cost three to four times as much as needed. Cross-linked polyethylene tanks provide the same benefits and reliability as steel tanks.In addition, Poly Processings SAFE-Tank system provides the same double-wall tank system and resistance to corrosion as stainless steel, while offering benefits that steel tanks cant match:Smaller footprintour double-wall system eliminates the need for a large concrete berm.Lower initial costsXLPE tanks are a fraction of the cost of steel.Lower long-term costsno concrete berm means less maintenance or repair over the life of your storage system.Conservation of lost chemicalif a leak occurs, the double-wall system contains any leaked chemical, preventing loss.When you consider the fact that cross-linked chemical tanks match or exceed the performance of steel tanks with a 75 percent cost savings its easy to see why our customers prefer Poly Processings XLPE chemical storage solutions.For additional information on how to store Phosphoric Acid, please contact a chemical storage tank expert at Poly Processing.

What temperature does phosphoric acid freeze. What happens when phosphoric acid is heated. Decomposition of phosphoric acid.