

PELS® PLUS ANHYDROUS CAUSTIC BEADS

CAS Number: 1310-73-2
Synonyms: dry sodium hydroxide, beaded caustic soda, solid caustic soda beads
Chemical Formula: NaOH
Molecular Weight: 40.0
Description: *PELS PLUS* anhydrous caustic beads are white and spherical. Dry caustic soda has a white color and a microcrystalline structure. It is anhydrous, hygroscopic (attracting moisture) and deliquescent (dissolving in moisture absorbed from the atmosphere) and reacts with carbon dioxide in the air to form sodium carbonate.

Refer to the Safety Data Sheet (SDS) for additional information and before handling this material.

Product Overview

PELS® PLUS Anhydrous Caustic Beads is a premium grade of dry caustic soda beads manufactured by Westlake Corporation. The *PELS PLUS* anhydrous caustic bead product has the advantages of guaranteed purity with a consistent diameter, averaging $\frac{3}{4}$ millimeters. It offers superior properties over other beaded dry caustic forms: little or no dust, excellent flow properties, uniform size, excellent blending characteristics, structural strength, high bulk density and low moisture pickup, resulting in less caking or lumping. Westlake Corporation, the only North American producer of anhydrous beaded caustic, produces *PELS PLUS* caustic in New Martinsville, West Virginia.

Production

Westlake produces *PELS PLUS* anhydrous caustic beads with an average diameter of $\frac{3}{4}$ millimeter, corresponding to 25 mesh. *PELS PLUS* anhydrous caustic beads offer superior properties over other forms of beaded caustic. *PELS PLUS* anhydrous caustic beads have low concentrations of trace metals and impurities, like salt, which can cause residual chloride problems. The highly uniform spherical shape, having a minimum surface area per pound, reduces moisture pickup. Freedom from dust on the bead surface also slows moisture pickup. The remarkable size uniformity of *PELS PLUS* eliminates storage bin segregation and reduces the likelihood of hang-up due to bridging. The spherical shape also enables *PELS PLUS* anhydrous caustic beads to roll and flow easily. In closed system delivery (CSD)—the closed-loop pneumatic conveying system developed by Westlake for bulk shipping and unloading—the beads are easier to convey and produce far less dust than flakes.

Uses

The host of different uses of *PELS PLUS* anhydrous caustic beads are derived mainly from its reactivity as a strong alkali. *PELS PLUS* should be specified over other forms of caustic soda when a high degree of accuracy or purity is required. With all downstream applications, appropriate registrations and/or approvals may be required. Possible uses are described below:

- **Printed wire circuit board (PWC) production** - *PELS PLUS* anhydrous caustic beads are used as an etchant in PWC manufacture. The ultra low salt concentration reduces residual chloride.
- **Specialty Metal Galvanization and Metal Cleaning** - *PELS PLUS* anhydrous caustic beads can clean metals by saponifying surface oils to create a thin soapy layer. In certain types of metals it can be used to etch the surface, an important preparatory step in many welding or painting applications. Due to

very low impurities, *PELS PLUS* anhydrous caustic beads leave a highly clean surface, prepped for painting and coating.

- **Pharmaceutical Production** - *PELS PLUS* anhydrous caustic beads have an ultra low impurity concentration, and uniform density, making it a highly accurate intermediate for pharmaceutical production.
- **Volumetric measured applications** - When accurate measurements are critical, *PELS PLUS* is used due to its highly uniform density and spherical shape.
- **Food and Dairy** - *PELS PLUS* anhydrous caustic beads are used in various food processing methods. This includes washing and chemical peeling of fruits and vegetables, poultry, soft drink, chocolate and cocoa processing, and thickening ice cream.
- **Textile Treatment** - *PELS PLUS* anhydrous caustic beads are used as an aid in scouring, bleaching and neutralizing during textile processing.
- **Chemical Production** - Besides its use as a reactive intermediate and catalyst in chemical production, *PELS PLUS* anhydrous caustic beads are also used in chemical processing plants for scrubbing and drying.
- **General and Industrial Cleaning** - A strong base like *PELS PLUS* anhydrous caustic beads can be used as an alkali source in cleaning agents. It can dissolve grease, oils, fats and protein based deposits. A *PELS PLUS* caustic soda solution with added surfactants stabilizes dissolved substances and prevents re-deposition. *PELS PLUS* is also used, for example, to clean and prepare sheet steel in galvanizing plants, and caustic soda is the chief ingredient for drain pipe cleaners.
- **Soap and Detergent** - *PELS PLUS* anhydrous caustic beads saponifies fats into water-soluble sodium soaps with few trace impurities.
- **Biodiesel and Bioethanol** - In manufacturing biodiesel and bioethanol, *PELS PLUS* anhydrous caustic beads is used as a catalyst for the transesterification of methanol and triglycerides, and used for pH adjustment and formation of in situ sodium methylate. Anhydrous *PELS PLUS* anhydrous caustic beads is required, because the presence of water would form soap.
- **General Industrial** - *PELS PLUS* anhydrous caustic beads is used in a variety of plants making products ranging from glue, gelatin, grease and cosmetics to dry batteries, agricultural products, and paint and varnish removers.
- **Water Treatment** - *PELS PLUS* anhydrous caustic beads is used in water treatment for resin bed deionization.

Health Effects

Read and follow all instructions on the product label and review the Safety Data Sheet (SDS) to understand and avoid the hazards associated with caustic soda. Wear appropriate personal protective equipment and avoid direct contact. Eye contact with *PELS PLUS* anhydrous caustic beads causes serious eye damage including irreversible damage and blindness; repeated or prolonged exposure may cause conjunctivitis. Skin contact causes severe burns; repeated or prolonged exposure to skin can cause dermatitis. Ingestion of *PELS PLUS* anhydrous caustic beads may cause irreversible damage to mucous membranes; repeated or prolonged exposure may cause gastrointestinal disturbances. Inhalation of *PELS PLUS* anhydrous caustic beads may cause corrosive burns, including irreversible damage; repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.

The United States Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have established or recommended occupational airborne exposure limits for caustic soda. The OSHA Permissible Exposure Limit (PEL) is an 8 hour Time-Weighted Average (TWA) of 2 mg/m³ (milligrams per cubic meter). The ACGIH Threshold Limit Value (TLV) is a Ceiling Limit of 2 mg/m³. A Ceiling Limit should not be exceeded during any part of the working exposure.

Before handling, it is important that engineering controls are operating and protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly trained regarding its hazards and its safe use and should be given the opportunity to review this document and the safety data sheet.

Environmental Effects

PELS PLUS anhydrous caustic beads should be kept out of lakes, streams, ponds, or other water sources. *PELS PLUS* anhydrous caustic beads does not bioaccumulate due to its high solubility in water.

Exposure Potential

Precautions should be taken to minimize potential harm to people, animals and the environment. Potential for exposure may vary depending upon site-specific conditions. When handling *PELS PLUS* anhydrous caustic beads, refer to the Safety Data Sheet and Product Warning Label and follow all instructions and warnings. Based on the expected uses for *PELS PLUS* anhydrous caustic beads, exposure could be through:

- **Workplace exposure** - Exposure can occur either in a *PELS PLUS* anhydrous caustic beads manufacturing facility or in the various industrial facilities that use *PELS PLUS* anhydrous caustic beads. Caustic soda has been used for more than 100 years by industry. When exposures occur, they are most frequently to the skin and eyes, although oral exposure and ingestion are possible. Good industrial hygiene practices and the use of personal protective equipment will, when combined with proper training and environmental, health and safety practices, contribute to a safe work environment.
- **Environmental releases** - In the event of a spill, contain the spill to prevent contaminated soil, surface or ground water. *PELS PLUS* anhydrous caustic beads can significantly increase the pH of soil and/or water. Industrial spills (releases to soil or water) should be controlled by workplace spill programs which include containment around loading and unloading operations and storage tanks and employee training. Many aspects of a spill control program are mandated by federal, state and local requirements. In addition, if a spill occurs, governmental reporting may be required. Refer to the Safety Data Sheet for instructions to contain and clean up a spill to minimize exposure.
- **Consumer exposure** - *PELS PLUS* anhydrous caustic beads is not sold directly to consumers; however it is an ingredient in some consumer products. Keep all chemical products out of the reach of children

Safe Handling and Storage

Always take precautions to minimize potential harm to people, animals, and the environment. When making solutions or diluting, *PELS PLUS* anhydrous caustic beads should only be added slowly to the surface of cold water while stirring. Do not add to warm or hot water because a violent eruption or an explosive reaction can result. Avoid contact with organic materials and concentrated acids as this may cause violent reactions.

Besides reacting vigorously with many organic and inorganic materials, caustic soda attacks certain metals including aluminum, magnesium, zinc, tin, chromium, brass, and bronzes made with zinc or tin. Since galvanizing is done with zinc, liquid caustic soda will attack galvanized iron surfaces. The reaction may be dangerous because hydrogen is generated and may introduce an explosion hazard. *PELS PLUS* anhydrous caustic beads can also react with various food sugars to generate hazardous carbon monoxide gas.

The creation and dilution of caustic soda solutions produces considerable heat and may cause boiling, spattering, or violent eruption. Workers should be properly instructed in dilution procedures and exercise caution.

Do not add water to *PELS PLUS* anhydrous caustic beads. The proper way is to add the beads slowly to the surface of cold water and agitate while they dissolve to avoid violent eruption or explosive reaction. If the water is not agitated, adding *PELS PLUS* anhydrous caustic beads rapidly is dangerous. The danger is greater if the water is warm instead of cold. The high heat of solution of dry caustic soda may cause a sudden violent eruption of caustic solution. Also, a layer of concentrated solution may form and suddenly mix with a layer of less concentrated solution. In this case, the high heat of solution may create steam and cause the solution to erupt.

During stock rotation, due to its hygroscopic nature, *PELS PLUS* anhydrous caustic beads inventory should be rotated on a First In/First Out (FIFO) basis to ensure that all product is consumed within a 180-day period. This will minimize any product agglomeration in the package.

Packaging and Shipping

Westlake offers *PELS PLUS* anhydrous caustic beads in a variety of package options and shipping methods to meet individual customer needs. *PELS PLUS* anhydrous caustic beads is shipped in 100- and 500- pound steel and fiber drums and 2000- and 2200- pound FIBC (Flexible Intermediate Bulk Containers). All drums and bags are moisture resistant and are delivered by rail and truck. Westlake owns pressure-differential cars and trailers used for CSD (closed system delivery) of *PELS PLUS* anhydrous caustic beads in bulk. The capacity of a bulk hopper car is 95 tons, and a bulk hopper trailer holds 20 tons.

Fire and Explosion Hazards

Caustic soda by itself is nonflammable and nonexplosive. However, caustic soda attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air.

During a fire, promptly isolate the scene by removing all persons from the vicinity of the incident. No other action shall be taken without suitable training. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Physical and Chemical Properties

PELS PLUS anhydrous caustic beads are white and spherical. Dry caustic soda has a white color and a microcrystalline structure. It is anhydrous, hygroscopic (attracting moisture) and deliquescent (dissolving in moisture absorbed from the atmosphere) and reacts with carbon dioxide in the air to form sodium carbonate.

PELS PLUS anhydrous caustic beads reacts readily with metals such as aluminum, magnesium, zinc, tin, chromium, bronze, brass, copper, and alloys containing these metals. Galvanized (zinc coated) materials and contact with acids, halogenated organics, organic nitro compounds, and glycol should be avoided. Caustic soda reacts with most animal tissue, including leather, human skin, and eyes. It also reacts readily with various reducing sugars (i.e., fructose, galactose, maltose, dry whey solids) to produce carbon monoxide. Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death.

| Properties of <i>PELS PLUS</i> Anhydrous Caustic Beads | |
|--|---------------------------|
| Boiling Point | 2534°F (1390°C) |
| Melting Point (crystallization begins) | 590-608°F (310- 320°C) |
| Specific Gravity | 2.13 |
| Bulk Density | |
| Compacted | 73 lb/ft ³ |
| Loose | 70 lb/ft ³ |
| pH at 20°C | Strongly Basic |
| <u>Solubility in Water</u> | |
| At 0 °C (32 °F): | 42 g/100 g water |
| At 100 °C (212 °F): | 347 g/100 g water |
| Solution Rate | Twice as fast as flake |
| Refractive Index | 1.3576 |
| Particle Shape | Spherical |
| Flowability | Excellent |
| Friability | Very Low |
| Dust | Very Low |
| <u>Typical Screen Analysis (US Mesh)</u> | <u>Weight % on Screen</u> |
| 14 | <1 |
| 16 | 3 |
| 20 | 31 |
| 25 | 41 |
| 30 | 17 |
| 35 | 5 |
| 60 | 2 |
| 170 | <1 |

Regulatory Information

The *PELS PLUS* anhydrous caustic beads Safety Data Sheet contains regulatory information, including Chemical Inventory Status, California Proposition 65 status, and Transportation Classifications. The following is additional regulatory information.

North American Regulatory Information

- **FDA Status** - *PELS PLUS* (Sodium Hydroxide) is designated by FDA as a food additive Generally Recognized as Safe (GRAS) when used in accordance with good manufacturing practices (21 CFR 184.1763). It is specifically approved for use per the following FDA citations: 21 CFR 172.892 (Food Starch-Modified, modified up to 1%), 21 CFR 173.310 (Boiler Water Additive), 21 CFR 177.1600 (Polyethylene Resins, Carboxyl Modified). It is also cleared for

reaction with fatty triglycerides and their fatty acid, alcohol, or dimer derivatives listed in 21 CFR 176.210 to form soaps under 21 CFR 175.105 (Adhesives), 21 CFR 176.210 (Defoaming Agents used in the manufacture of paper and paperboard), and 21 CFR 178.3120 (Animal Glue).

- **CONEG Regulation/Model Toxics in Packaging Legislation** - Lead, cadmium, mercury and hexavalent chromium are not intentionally added to *PELS PLUS*, and based on the formula and Westlake's experience with the product, the sum of the incidental concentration levels of these metals is not expected to exceed 100 parts per million (ppm) by weight.
- **RCRA** - Commercial grade *PELS PLUS* if discarded or spilled, as well as other wastes generated during use of sodium hydroxide or containing sodium hydroxide may exhibit one or more hazardous waste characteristics under 40 CFR 261.24, including D002 - corrosive. (Note: Westlake provides information on U.S. hazardous waste criteria for the product as manufactured. It remains the obligation of the user to evaluate their specific waste and to manage, treat, and dispose of unused material, residues, and containers in accordance with applicable federal, state, and local requirements.)
- **VOC Information** - *PELS PLUS* does not contain constituents that qualify as volatile organic compounds (VOC) based on the definition in 40 CFR 51.100.
- **HAP Information** - *PELS PLUS* does not contain hazardous air pollutants (HAPs) as listed in the Clean Air Act Amendments of 1990, 42 USC 7412 (b).
- **Ozone-Depleting Chemicals** - *PELS PLUS* is not/does not contain ozone depleting chemicals (40 CFR 82, Subpart A, Appendix F)
- **CERCLA Hazardous Substance** - Sodium hydroxide appears in the List of Hazardous Substances and Reportable Quantities table (40 CFR 302.4) with a reportable quantity (RQ) of 1,000 pounds (454 Kg).
- **FDA Bioterrorism Act of 2002 Section 305 (Registration of Food Facilities)** - The following facility has been registered with the FDA: New Martinsville, WV, USA (Registration Number 11696337946).
- **TSCA Information** - This product is not currently subject to any rule or order under TSCA Sections 4,5,7,8(a), or 8(d).

Other Regulatory Information

- **RoHS/WEEE** - *PELS PLUS* has been reviewed with regard to the EU Directive 2011/65/EU "Restriction on the Use of Certain Hazardous Substances" (RoHS 2). Based on our knowledge of this product and information on the raw material suppliers' Safety Data Sheets, this product does not contain cadmium, hexavalent chromium, lead, mercury, polybrominated biphenyls (PBBs) or polybrominated diphenyl ethers (PBDEs) at levels greater than the tolerated maximum concentration values established by the directive.

Product Certifications and Listings

- **American Water Works Association Standard** - *PELS PLUS* conforms to the chemical identity, physical composition and packaging requirements of the AWWA Standard for Sodium Hydroxide (caustic soda), ANSI/AWWA B501-08.
- **NSF Standard 60 Drinking Water Treatment Chemicals** - *PELS PLUS* has the Health Effects listing, and is certified for maximum use levels as noted on the NSF website, which can be viewed at www.nsf.org/certified/PwsChemicals.
- **USP/NF Residual Solvents** - Westlake does not use any Class 1, Class 2 or Class 3 (or any

combination thereof) residual solvents, as denoted within USP Chapter <467>, during the manufacture of *PELS PLUS*.

- **Kosher Certification** - *PELS PLUS*, including the equipment used in its' manufacture, does not come into contact with or contain any animal by-products, animal fats, or animal products, nor does it contain chemical additives that are organic in nature. According to the current policies of the Orthodox Union (OU) caustic soda is acceptable for use in Kosher-related activities without Kosher certification.
- **Halal Certification** - Westlake's *PELS PLUS* is not Halal certified. However, *PELS PLUS* does not contain alcohol, natural L-cysteine extracted from hair or feathers, animal fats and/or extracts, blood of any origin, blood plasma, or pork/or other meat byproducts. Alcohol is not used as processing aid. As such, this product may be acceptable for Halal consideration.

Additional Product Information

- **Source** - *PELS PLUS* is derived from a mineral source and has not been derived from plant, animal, synthetic, petroleum or fermentation sources.
- **Allergenic Materials** - *PELS PLUS* is not manufactured using any of the following allergenic materials: carmine/cochineal extracts, celery, colors/color additives, dyes/food dyes, eggs/egg products, seafood/fish/shellfish/crustaceans, flavors, glutens, legumes, milk, mollusks, monosodium glutamate (MSG), mustards, plant nuts/seeds/oils (sesame, sunflower, safflower, canola, etc.), peanuts/peanut products, protein hydrolysates, soy/soybeans/soybean products, spices, sulfites, sulfates, tree nuts/tree nut oils and wheat.
- **Bovine Spongiform Encephalopathy** - *PELS PLUS* is not of animal origin, and, to Westlake's knowledge, does not contribute to Transmissible Spongiform Encephalopathy (TSE)/Bovine Spongiform Encephalopathy (BSE).
- **Genetically Modified Organisms (GMOs)** - *PELS PLUS* is not manufactured with and does not contain genetically modified organisms.
- **Natural Latex Rubber** - *PELS PLUS* is not manufactured with and does not contain natural latex rubber as defined in 21 CFR 801.437(b)(1).
- **Nutritional Value** - *PELS PLUS* does not have nutritional value.

Product Stewardship

Westlake Corporation is committed to managing *PELS PLUS* anhydrous caustic beads so that it can be safely used by its employees and customers. Westlake's relationships with its customers encourage communication about safety and environmental stewardship.

Additional Information

For more information regarding Westlake's *PELS PLUS* anhydrous caustic beads, contact our customer service department by calling 800-243-6774.

References

- Westlake Corporation Web page: <http://www.Westlake.com/>

Notice

Prior to its use, the user is responsible for determining the suitability of the product or products covered by this Product Stewardship Summary and for complying with all federal, state, and local laws and regulations in connection with its use. Neither Westlake Corporation nor any of its affiliates shall be responsible for any damages of any kind whatsoever resulting from the use of or reliance on this Product Stewardship Summary or product or products to which it refers.

This Product Stewardship Summary is intended only to provide a general summary of the potential hazards associated with the product or products described herein. It is not intended to provide detailed information about potential health effects and safe use and handling information and, although Westlake Corporation believes this information is correct, Westlake Corporation makes no warranties as to its completeness or accuracy. Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the Westlake Corporation product(s) mentioned in this document. Before working with any of these products, users must read and become familiar with the available information on product hazards, proper use, and handling. Information is available in several forms, such as safety data sheets (SDS) and product labels. A copy of Westlake's SDS for PELS Plus anhydrous caustic beads can be obtained by going to the company's website www.Westlake.com.

This information is subject to change without notice.

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