

## PELS® 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* 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® Anhydrous Caustic Beads is a convenient form of dry caustic soda beads developed by Axiall Corporation. The tiny beads, close to ¼ millimeter in diameter, offer superior properties: 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. Axiall Corporation, the only North American producer of beaded caustic, produces *PELS* at two plants in the US: Lake Charles, Louisiana, and New Martinsville, West Virginia.

### Production

Axiall produces *PELS* anhydrous caustic beads with an average diameter of ¼ millimeter, corresponding to 25 mesh. *PELS* offers superior properties over other forms of beaded caustic. The spherical shape, having a minimum surface area per pound, minimizes moisture pickup. Freedom from dust on the bead surface also slows moisture pickup. The remarkable size uniformity of *PELS* eliminates storage bin segregation and reduces the likelihood of hang-up due to bridging. The spherical shape also enables *PELS* anhydrous caustic beads to roll and flow easily. In CSD (closed system delivery) — the closed-loop pneumatic conveying system developed by Axiall 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* anhydrous caustic beads is derived mainly from its reactivity as a strong alkali. With all downstream applications, appropriate registrations and/or approvals may be required. Possible uses are described below:

- **Petroleum Exploration** - *PELS* anhydrous caustic beads is used as a treating agent in oil well drilling fluids. It is used to increase viscosity, which prevents heavier materials from settling.
- **Food and Dairy** - *PELS* anhydrous caustic beads is 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* anhydrous caustic beads is 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* anhydrous caustic beads is also used in chemical processing plants for scrubbing and drying.
- **General and Industrial Cleaning** - A strong base like *PELS* 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*

caustic soda solution with added surfactants stabilizes dissolved substances and prevents re-deposition. *PELS* caustic soda 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* anhydrous caustic beads saponifies fats into water-soluble sodium soaps.
- **Biodiesel and Bioethanol** - In manufacturing biodiesel and bioethanol, *PELS* 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* is required, because the presence of water would form soap.
- **Metal Cleaning** - *PELS* 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.
- **General Industrial** - *PELS* 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.

## 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* 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 will cause dermatitis. Ingestion of *PELS* anhydrous caustic beads may cause irreversible damage to mucous membranes; repeated or prolonged exposure may cause gastrointestinal disturbances. Inhalation of *PELS* anhydrous caustic beads may cause corrosive burns, including irreversible damage; repeated or prolonged exposure to corrosive materials or 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/m<sup>3</sup> (milligrams per cubic meter). The ACGIH Threshold Limit Value (TLV) is a Ceiling Limit of 2 mg/m<sup>3</sup>. 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* anhydrous caustic beads should be kept out of lakes, streams, ponds, or other water sources. *PELS* 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* 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* anhydrous caustic beads, exposure could be through:

- **Workplace exposure** - Exposure can occur either in a *PELS* anhydrous caustic beads manufacturing facility or in the various industrial facilities that use *PELS* 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* 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* 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* 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, *PELS* anhydrous caustic beads will attack galvanized iron surfaces. The reaction may be dangerous because hydrogen is generated and may introduce an explosion hazard. *PELS* anhydrous caustic beads can also react with various food sugars to generate hazardous carbon monoxide gas.

The creation and dilution of *PELS* anhydrous caustic beads 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* 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* 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* 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

Axiall offers *PELS* anhydrous caustic beads in a variety of package options and shipping methods to meet individual customer needs. It is shipped in 500-pound and 100-pound steel drums, in 500-pound fiber drums, in 2000 and 2200-pound FIBC (Flexible Intermediate Bulk Containers), and in 50-pound bags. All drums and bags

are moisture-resistant and are delivered by rail and truck. Axiall owns pressure-differential cars and trailers used for CSD (closed system delivery) of *PELS* anhydrous caustic beads in bulk. The capacity of a bulk hopper car is 95 tons, and a bulk hopper trailer holds 20 tons.

Bag shipments can be supplied on sturdy pallets protected by a shrink-wrapped polyethylene film. The bag has multiple layers including two moisture barriers: a heat-sealed polyethylene liner and a polyethylene ply. The bag exceeds Department of Transportation drop test standards for multiwall packages. Accelerated tests in a “jungle room” showed that the moisture vapor did not reach the anhydrous caustic beads. Drop tests performed after the “jungle room” showed virtually the same results as prior to the exposure.

### Fire and Explosion Hazards

*PELS* anhydrous caustic beads 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* 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* 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</i> Anhydrous Caustic Beads	
<b>Boiling Point</b>	2534°F (1390°C)
<b>Melting Point (crystallization begins)</b>	590-608°F (310- 320°C)
<b>Specific Gravity</b>	2.13
<b>Bulk Density</b>	
<b>Compacted</b>	73 lb/ft <sup>3</sup>
<b>Loose</b>	70 lb/ft <sup>3</sup>
<b>pH at 20°C</b>	Strongly Basic

Properties of <i>PELS</i> Anhydrous Caustic Beads	
<b>Solubility in Water</b>	
At 0 °C (32 °F):	42 g/100 g water
At 100 °C (212 °F):	347 g/100 g water
<b>Solution Rate</b>	Twice as fast as flake
<b>Refractive Index</b>	1.3576
<b>Particle Shape</b>	Spherical
<b>Flowability</b>	Excellent
<b>Friability</b>	Very Low
<b>Dust</b>	Very Low
<b>Typical Screen Analysis (US Mesh)</b>	<b>Weight % on Screen</b>
14	<1
16	3
20	31
25	41
30	17
35	5
60	2
170	<1

## Regulatory Information

The *PELS* 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* (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* anhydrous caustic beads, and based on the formula and Axiall'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* anhydrous caustic beads 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: Axiall 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* anhydrous caustic beads does not contain constituents that qualify as volatile organic compounds (VOC) based on the definition in 40 CFR 51.100.
- **HAP Information** - *PELS* anhydrous caustic beads 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* anhydrous caustic beads 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 facilities have been registered with the FDA: Lake Charles, Louisiana, USA (Registration Number 14461027778) and 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* anhydrous caustic beads 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* anhydrous caustic beads 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* anhydrous caustic beads 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](http://www.nsf.org/certified/PwsChemicals).
- **NSF White Book** - The NSF International White Book Listings of USDA Authorized or NSF Registered Nonfood Compounds for *PELS* are A2 (Compounds for use in soak tanks), G6 (Treating boilers with edible product contact), 3B (Hog scald agents) and 3C (Tripe denuding, bleaching, and neutralizing agents). These can be viewed on [www.nsf.org/usda/psncllistings.asp](http://www.nsf.org/usda/psncllistings.asp).
- **USP/NF Residual Solvents** - Axiall 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* anhydrous caustic beads.
- **Kosher Certification** - *PELS* anhydrous caustic beads, 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** - Axiall’s *PELS* anhydrous caustic beads is not Halal certified. However, *PELS* anhydrous caustic beads 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* anhydrous caustic beads is derived from a mineral source and has not been derived from plant, animal, synthetic, petroleum or fermentation sources
- **Allergenic Materials** - *PELS* anhydrous caustic beads 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.
- **Animal Testing** - *PELS* anhydrous caustic beads has not been tested on animals by Axiall since December 31, 1990.
- **Bovine Spongiform Encephalopathy** - *PELS* anhydrous caustic beads is not of animal origin, and, to Axiall's knowledge, does not contribute to Transmissible Spongiform Encephalopathy (TSE)/Bovine Spongiform Encephalopathy (BSE).
- **Genetically Modified Organisms (GMOs)** - *PELS* anhydrous caustic beads is not manufactured with and does not contain genetically modified organisms.
- **Natural Latex Rubber** - *PELS* anhydrous caustic beads is not manufactured with and does not contain natural latex rubber as defined in 21 CFR 801.437(b)(1).
- **Nutritional Value** - *PELS* anhydrous caustic beads does not have nutritional value.

## Product Stewardship

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

## Additional Information

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

## References

- Axiall Corporation Web page: <http://www.axiall.com/>
- Axiall Safety Data Sheets: <http://www.axiall.com/en-US/Products/Safety-Data-Sheets/>

## 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 Axiall 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 Axiall Corporation believes this information is correct, Axiall 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 Axiall 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 Axiall's SDS for *PELS* anhydrous caustic beads can be obtained by going to the company's website [www.axiall.com](http://www.axiall.com).

This information is subject to change without notice.

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