

**INCH-POUND**

O-S-642G

May 7, 1993

SUPERSEDING

O-S-642F(SH)

February 17, 1984

(See 6.7)

## FEDERAL SPECIFICATION

SODIUM PHOSPHATE, TRIBASIC, ANHYDROUS;  
DODECAHYDRATE; AND MONOHYDRATE; TECHNICAL

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

## 1. SCOPE

1.1 Scope. This specification covers three types of tribasic sodium phosphate suitable for boiler water treatment and various washing, cleaning, and scouring processes (see 6.1).

1.2 Classification.

1.2.1 Types. The tribasic sodium phosphate covered by this specification is of the following types as specified (see 6.2).

Type I. Anhydrous ( $\text{Na}_3\text{PO}_4$ ).

Type II. Dodecahydrate ( $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ ).

Type III. Monohydrate ( $\text{Na}_3\text{PO}_4 \cdot \text{H}_2\text{O}$ ).

## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, ATTN: 05Q42, Naval Sea Systems Command, 2531 Jefferson Davis Hwy, Arlington, VA 22242-5160 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6810

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specifications:

PPP-B-566 - Boxes, Folding, Paperboard.  
 PPP-B-601 - Boxes, Wood, Cleated-Plywood.  
 PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.  
 PPP-B-636 - Boxes, Shipping, Fiberboard.  
 PPP-D-723 - Drums, Fiber.  
 PPP-B-1055 - Barrier Material, Waterproofed, Flexible.

Federal Standards:

FED-STD-313 - Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities.  
 FED-STD-536 - Soap and Soap-Products (Including Synthetic Detergents); Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bi-monthly supplements as issued, is for sale on a subscription basis by the General Services Administration, Specifications Units (WFSIS), 7th and D Street SW, Washington, DC 20407.)

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications:

MIL-L-10547 - Liners, Case and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible.

Military Standards:

MIL-STD-129 - Marking for Shipment and Storage.  
 MIL-STD-147 - Palletized Unit Loads.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

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Federal Regulations:

## DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulations (CFR)

CFR 49, Parts 100-199 - Hazardous Material Regulations.

DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION  
(OSHA)

Code of Federal Regulations (CFR)

CFR 29, Part 1910.1200 - Hazard Communication.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

2.2 NonGovernment publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 501 - Standard Test Methods of Sampling and Chemical Analysis of Alkaline Detergents. (DoD adopted)

D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

## 3. REQUIREMENTS

3.1 Composition. The material, as received, shall conform to the chemical and physical characteristics of table I when tested as specified in 4.4. The offerer/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable.

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TABLE I. Chemical and physical characteristics.

Characteristic	Type I		Type II		Type III	
	Minimum percent	Maximum percent	Minimum percent	Maximum percent	Minimum percent	Maximum percent
Sodium phosphate, tribasic: Calculated as $\text{Na}_3\text{PO}_4$ , from $\text{P}_2\text{O}_5$	97.0	----				
Calculated as $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ , from $\text{P}_2\text{O}_5$			97.0	----		
Calculated as $\text{Na}_3\text{PO}_4 \cdot \text{H}_2\text{O}$ , from $\text{P}_2\text{O}_5$					97.0	----
Total alkalinity to methyl orange, as $\text{Na}_2\text{O}$	36.0	40.0	16.0	19.0	32.0	37.0
Phosphates as phosphoric anhydride $\text{P}_2\text{O}_5$	39.5	----	18.1	----	36.0	----
Matter insoluble in water	----	0.1	----	0.1	----	0.1
Particle size: Matter retained on:						
U.S. No. 20 sieve (powder)	----	1.0			----	None
U.S. No. 100 sieve (powder)	----	10.0			----	10.0
U.S. No. 10 sieve (granular)	----	5.0			----	5.0
U.S. No. 100 sieve (granular)	80.0	----			40.0	----
U.S. No. 10 sieve (all forms)			None	None		
U.S. No. 100 sieve (all forms)			90.0	----		

3.2 Type.

3.2.1 Type I. The tribasic sodium phosphate shall be powder or granular in form, as specified (see 6.2).

3.2.2 Type II. The tribasic sodium phosphate shall be granular, flake, or crystalline in form, as specified (see 6.2).

3.2.3 Type III. The tribasic sodium phosphate shall be powder or granular in form, as specified (see 6.2).

3.3 Labeling. Each unit container shall be durably and legibly marked with the following information (see 5.4):

"Avoid prolonged or repeated contact with eyes or skin.  
Avoid inhalation of particle dust."

3.4 Net content. The average net content per unit container shall be not less than specified.

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3.5 Material safety data sheet (MSDS). The contracting activity shall be provided a material safety data sheet at the same time of contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 5.6 and 6.6).

3.6 Workmanship. The finished product shall be white, uniform, free flowing, and free from foreign matter.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet the requirements of sections 3 and 5. The inspection set forth in this specification shall become part of the contractor's overall inspection or quality program. The absence of any inspection requirement in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Quality conformance inspection. Quality conformance inspection shall consist of the examination of 4.3, the testing of 4.4, and the inspection of 4.5 (see 6.3 and 6.4).

4.2.1 Lot. For the purpose of quality conformance inspection and test sampling, a lot is defined as all the sodium phosphate of the same type, produced in one facility using the same production processes and materials, prepared in a single run, and being offered for delivery at one time.

4.3 Examination of the end item. As a minimum, the contractor shall randomly select a sample quantity of filled containers of sodium phosphate in accordance with table II and examine them as specified herein. Each container shall be examined to verify compliance with all the requirements of this specification regarding fill, closure, marking, and other requirements not involving tests. Containers shall be examined for defects of the container and closure, for evidence of leakage, and for unsatisfactory markings. Each sample shall be weighed to determine the amount of the contents. The contents of each sample shall be examined for form and workmanship. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the contractor has the option of screening 100 percent of the lot for the defective characteristic(s) or providing a new lot which shall be examined in accordance with the sampling plan contained herein.

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TABLE II. Sampling for examination of the end item.

Lot size	Sample size
2 - 50	5
51 - 90	7
91 - 150	11
151 - 280	13
281 - 500	16
501 - 1,200	19
1,201 - 3,200	23
3,201 - 10,000	29
10,001 - 35,000	35
35,001 - Over	40

4.4 Testing of the end item. As a minimum, the contractor shall randomly select a sample quantity of sodium phosphate in accordance with table III and subject the sample to the tests of table IV. Samples of equal portion shall be thoroughly mixed to yield a one pound composite test sample representative of the lot. The composite sample shall be placed in a clean, dry, airtight container and sealed. Care shall be exercised to prevent the loss or absorption of moisture during the sampling, weighing, and storage. If one or more defects are found in any sample, the entire lot represented by the sample shall be rejected. If a lot is rejected, the contractor has the option of screening 100 percent of the lot for the defective characteristic(s) or providing a new lot which shall be tested in accordance with the sampling plan contained herein.

TABLE III. Sampling for testing of the end item.

Lot size (pounds of sodium phosphate)	Sample size
1 - 800	2
801 - 22,000	3
22,001 - Over	5

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TABLE IV. Testing of the end item.

Characteristic	Specification reference		Results reported as
	Requirement	Test method	
Sodium phosphate, tribasic	Table I	ASTM D 501	Average of 2 determinations to nearest 0.1 percent
Total alkalinity to methyl orange, as $\text{Na}_2\text{O}$	Table I	ASTM D 501	Average of 2 determinations to nearest 0.1 percent
Phosphates as phosphoric anhydrid, $\text{P}_2\text{O}_5$	Table I	ASTM D 501	Average of 2 determinations to nearest 0.1 percent
Matter insoluble in water	Table I	ASTM D 501	Average of 2 determinations to nearest 0.1 percent
Sieve tests	Table I	<sup>1/</sup> 2101	Average of 2 determinations to nearest 0.1 percent

<sup>1/</sup> Test shall be performed in accordance with test method 2101 of FED-STD-536.

4.5 Inspection of packaging. Sample packages and packs, and the inspection of the preservation, packing and marking for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

## 5. PACKAGING

5.1 Preservation. Preservation shall be level A, C, or commercial, as specified (see 6.2).

5.1.1 Level A. Sodium phosphate shall be packaged in 1-pound (453-gram), 4-pound (1812-gram) or 100-pound (45.36-kilogram) quantities, as specified (see 6.2). When specified (see 6.2), sodium phosphate, type II, shall be packaged in 25-pound (11.34-kilogram) quantities.

5.1.1.1 One- and 4-pound quantities. One or 4 pounds of sodium phosphate shall be packaged in siftproof sealed, end-folding, paperboard boxes in accordance with style I, type A, class a or b, variety 2 of PPP-B-566. Closures shall be in accordance with the appendix to PPP-B-566.

5.1.1.2 Twenty-five and 100-pound quantities. Twenty-five and 100-pound quantities of sodium phosphate shall be packed in drums as specified for the level of packing required in 5.2. Drums shall be provided with a polyethylene bag or liner having a minimum thickness of 3 mils. Closure of the bag or liner shall be by heat sealing or plastic coated metal twist tie.

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5.1.2 Level C. Sodium phosphate in the quantity specified (see 6.2) shall be packaged in accordance with Department of Transportation (DOT) regulations and any other applicable regulatory requirements in a manner that will preserve the chemical and physical characteristics of the product in containers that will retain integrity from the supply source to the first receiving activity for immediate use.

5.1.3 Commercial. Sodium phosphate in the quantity specified (see 6.2) shall be packaged in accordance with ASTM D 3951 in siftproof water resistant containers complying with DOT or other regulatory requirements.

5.2 Packing. Packing shall be level A, B, C, or commercial, as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 One- and 4-pound quantities. Forty-eight 1-pound boxes or twenty 4-pound boxes of sodium phosphate packaged as specified in 5.1, shall be packed in wood, or wood cleated plywood boxes in accordance with class 2 of PPP-B-621 or PPP-B-601 overseas type respectively. When specified (see 6.2) boxes shall be provided with case liners in accordance with PPP-B-1055 and fabricated in accordance with MIL-L-10547. All joints and seams of the case liner shall be sealed in accordance with the appendix of MIL-L-10547. Box closure and reinforcement shall be in accordance with PPP-B-601 or PPP-B-621 or appendix thereto.

5.2.1.2 Twenty-five and 100-pound quantities. Each 25- and 100-pound quantity of sodium phosphate packaged as specified in 5.1, shall be packed in metal or plywood drums in accordance with DOT 17C, 22A, 22B or 22C respectively. Closure shall be as specified for the applicable drum.

5.2.2 Level B.

5.2.2.1 One- and 4-pound quantities. Forty-eight 1-pound boxes or twenty 4-pound boxes of sodium phosphate, packaged as specified in 5.1, shall be packed in a snug-fitting fiberboard container in accordance with class weather resistant, grade Y3c or V3s, style RSC of PPP-B-636. Closure waterproofing and reinforcement shall be in accordance with method V of the appendix to PPP-B-636.

5.2.2.2 Twenty-five and 100-pound quantities. Each 25- and 100-pound quantity packaged as specified in 5.1 shall be packed in a fiber drum in accordance with type III of PPP-D-723. Drum closure shall be in accordance with the appendix of PPP-D-723.

5.2.3 Level C. Sodium phosphate in the quantity and packaged as specified in 5.1 shall be packed in containers as specified in 5.2.2 except that the containers may be of the domestic type, class or grade.

5.2.4 Commercial or industrial. Sodium phosphate in the quantity and packaged as specified in 5.1 shall be packed in accordance with ASTM D 3951.

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5.3 Palletization. When specified (see 6.2), sodium phosphate packed in accordance with 5.2 shall be palletized in accordance with MIL-STD-147. Pallet load types I and Ia are recommended for wood and fiberboard boxes, load types XIIa, XIIb, or XIII are recommended for drums.

5.4 Marking. In addition to any special marking required (see 3.3 and 6.2), level A, B, and C unit, shipping containers, and palletized unit loads shall be marked in accordance with MIL-STD-129. Commercial or industrial unit, shipping containers and palletized unit loads shall be marked in accordance with ASTM D 3951, the requirements of 3.3, and the contract or order (see 6.2).

5.6 Material safety data sheet. A copy of the MSDS shall be attached to the shipping document for each destination (see 3.5).

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Tribasic sodium phosphate covered by this specification is intended for boiler water treatment in addition to washing, cleaning, and scouring with or without soap when a fairly strong alkaline material is required. Protection of the eyes and skin is recommended.

6.1.1 Military use. Items acquired under this specification for military use are to be limited to the variety shown on the applicable military standard or military supply standard. Personnel of the military departments are requested to refer to these documents for guidance.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Type required (see 1.2.1 and 3.2).
- (c) Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1 and 2.2).
- (d) Form of tribasic sodium phosphate required (see 3.2.1, 3.2.2, and 3.2.3).
- (e) Selection of the applicable levels of preservation and packing (see 5.1 and 5.2).
- (f) Quantity of the product desired per package (see 5.1.1, 5.1.2, and 5.1.3).
- (g) When case liners are required (see 5.2.1.1).
- (h) When palletization is required (see 5.3).
- (i) Special marking required (see 5.4).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

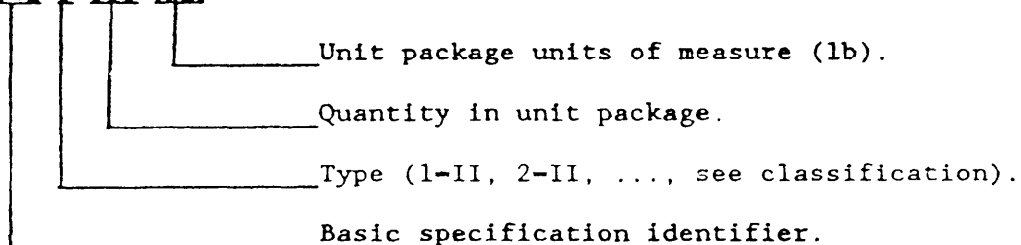
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<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
4.2	DI-NDTI-80809	Test, inspection reports	----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 Specification based part or identification number (PIN). The following specification based part identification numbering procedure shall be used to identify the items covered by this specification. The purpose of this procedure is to assist Government catalogers in developing the correct equipment/material PIN.

OS642-#-#-#-XXX



6.5 International standardization agreement. Certain provisions of this specification are the subject of international standardization agreement ABCA-NAVSTAG 6E. When amendment, revision or cancellation of this specification is proposed which affects or violates the international agreement concerned, the preparing activity will inform GSA so that appropriate reconciliation action may be taken through international standardization channels.

6.6 Materials Safety Data Sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313.

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6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

## MILITARY INTERESTS:

Custodians

Army - GL  
Navy - SH  
Air Force - 68

Review Activities

Army - MD, MI

User Activities

Army - AR  
Navy - MC

## CIVIL AGENCY COORDINATING ACTIVITIES:

FSS  
GPO  
NBS  
OSS

Preparing activity:  
Navy - SH  
(Project 6810,0125)

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

<b>I RECOMMEND A CHANGE:</b>		1. DOCUMENT NUMBER 0-S-642G	2. DOCUMENT DATE (YYMMDD) 07/05/93
3. DOCUMENT TITLE SODIUM PHOSPHATE, TRIBASIC, ANHYDROUS, DODECAHYDRATE: AND MONOHYDRATE: TECHNICAL			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY TECHNICAL POINT OF CONTACT (TPOC):			
a. NAME MR. ALBELFIELD (05X22)		b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON	
PLEASE ADDRESS ALL CORRESPONDENCE TO:		(703) 602-1592 8-332-1592	
c. ADDRESS (Include Zip Code) COMMANDER, SEA 05Q42 NAVAL SEA SYSTEMS COMMAND 2531 JEFFERSON DAVIS HWY ARLINGTON, VA 22242-5160		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	