

**SPECIFICATION
FOR
CHEMICALS**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers various alkalies and chemicals.

This specification is not meant to cover all varieties of chemicals which may be commercially available, but is intended to cover those generally used for general cleaning and laundry operations by State agencies, schools, and colleges.

I. CLASSIFICATION

Chemicals covered by this specification are classified as follows:

Type A - General Cleaners

<u>Class</u>	<u>Description</u>
1	Ammonium Hydroxide (Household Ammonia)
2	Caustic Soda (Anhydrous)
3	Soda Ash
4	Sodium Bicarbonate
5	Trisodium Phosphate

Type B - Laundry Uses

<u>Class</u>	<u>Description</u>
1	Sodium Metasilicate
2	Sodium Polyphosphates

II. APPLICABLE STANDARDS

The following documents (latest revision) in effect on the date of the Invitation for Bids shall form a part of this specification:

- | | |
|---------------------|---|
| - ASTM D 456 | Standard Specification For Caustic Soda (Anhydrous) |
| - ASTM D 458 | Standard Specification For Soda Ash |
| - ASTM D 928 | Standard Specification For Sodium Bicarbonate |
| - ASTM D 537 | Standard Specification For Sodium Metasilicate |
| - ASTM D 538 | Standard Specification For Trisodium Phosphate |
| Fed O-S-635D | Standard Specification For Sodium Polyphosphates |
| Fed O-A-451F(1) | Standard Specification For Ammonium Hydroxide |
| - ASTM D 501 | Standard Test Methods of Sampling and Chemical Analysis of Alkaline Detergents |

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III. REQUIREMENTS

A. TYPE A, CLASS 1 - AMMONIUM HYDROXIDE (HOUSEHOLD AMMONIA)

1. General Requirements

- a) Ammonium Hydroxide shall be a colorless, transparent, aqueous solution of ammonia (NH₃) and water, visually free from foreign matter.
- b) The material shall be packaged and labeled in conformity with local, State, and Federal requirements.
- c) The material shall be purchased by volume.
- d) This material shall be suitable for various washing, cleaning, and scouring processes.
- e) This material may be hazardous if not properly managed.
- f) Precautionary information for the safe use, storage and disposal of this material should be preliminarily obtained from suppliers and others.
- g) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.

2. Chemical Composition

Assay (as NH₃), percent by weight shall be 4-5%.

B. TYPE A, CLASS 2 - CAUSTIC SODA (ANHYDROUS)

1. General Requirements

- a) Caustic Soda (Anhydrous) shall be furnished in air-tight containers in flake, or coarsely powered form as specified by the purchaser.
- b) The material shall be purchased by net weight.
- c) The material shall be packaged and labeled in conformity with local, State, and Federal requirements.
- d) This material shall be suitable for various washing, cleaning, and scouring processes, with or without soap as conditions demand, and where a strongly alkaline material is desired.
- e) This material may be hazardous if not properly managed.
- f) Precautionary information for the safe use, storage, and disposal of this material should be preliminarily obtained from suppliers and others.
- g) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.

2. Chemical Composition

Caustic soda (anhydrous), as received, shall conform to the following requirements as to chemical composition:

Total alkalinity as Na ₂ O, min.%	75.5
Sodium hydroxide (NaOH), min.%	96
Carbonate as Na ₂ CO ₃ , max.%	2

C. TYPE A, CLASS 3 - SODA ASH

1. General Requirements

- a) Soda ash shall be a high-grade anhydrous sodium carbonate in powdered form and shall be of the type specified by the purchaser (light or dense).
NOTE: This specification covers the 58% (Na₂O) grade or soda ash.
- b) Soda ash shall be purchased by net weight as packed at the place of manufacture.
- c) The material shall be packaged and labeled in conformity with local, State, and Federal requirements.
- d) This material shall be suitable for various washing, cleaning, and scouring processes, with or without soap as conditions demand, and where a moderately strong alkaline material is desired.
- e) This material may be hazardous if not properly managed.
- f) Precautionary information for the safe use, storage and disposal of this material should be preliminarily obtained from suppliers and others.
- g) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.

2. Chemical Composition

Soda ash, after drying for 1 h at 155°C, shall conform to the following requirements as to chemical composition:

Total alkalinity, calculated as Na ₂ CO ₃ , min.%	99.26
Sodium bicarbonate (NaHCO ₃), max.%	0.5
Matter insoluble in water, max.%	0.25

D. TYPE A, CLASS 4 - SODIUM BICARBONATE

1. General Requirements

- a) This material shall be a white, uniform powder. Any caking shall be capable of being readily disintegrated.
- b) Sodium Bicarbonate shall be purchased by net weight.
- c) This material shall be suitable for use in various washing, cleaning, and scouring processes, with or without soap as conditions demand, and where a mildly alkaline material is desired.
- d) This material may be hazardous if not properly managed. Precautionary information for the safe use, storage, and disposal of this material should be preliminarily obtained from suppliers and others. In case of personal accident

with this material, apply appropriate first aid; telephone nearest Poison Control Center for assistance, and get medical attention immediately.

2. Chemical Composition

Sodium bicarbonate (NaHCO₃) as received shall conform to the following requirements as to chemical composition:

Na ₂ CO ₃ , max.%	0.4
NaHCO ₃ , min.%	99.6
Matter insoluble in water, max.%	0.1

E. TYPE A, CLASS 5 - TRISODIUM PHOSPHATE (ANHYDROUS)

1. General Requirements

- a) Trisodium Phosphate shall be a white, uniform product.
- b) This material shall be suitable for various washing, cleaning, and scouring processes, with or without soap as conditions demand, and where a moderately strong alkaline material is desired.
- c) This material may be hazardous if not properly managed.
- d) Precautionary information for the safe use, storage, and disposal of this material should be preliminarily obtained from suppliers and others.
- e) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.
- f) Trisodium Phosphate shall be purchased by net weight.

2. Chemical Composition

Trisodium Phosphate, as received shall conform to the following requirements as to chemical composition:

	min.	max.
Trisodium Phosphate:		
Calculated as Na ₃ PO ₄ from P ₂ O ₅ %	97	...
Calculated as Na ₃ PO ₄ •H ₂ O from P ₂ O ₅,%	...	...
Calculated as Na ₃ PO ₄ , 12H ₂ O, from P ₂ O ₅%	...	...
Total alkalinity to methyl orange, as Na ₂ O,%	36	40
Phosphoric anhydride (P ₂ O ₅),%	39.5	...
Matter insoluble in water,%	...	0.1

F. TYPE B, CLASS 1 - SODIUM METASILICATE

1. General Requirements

- a) Sodium Metasilicate shall be a uniform product in one of the following forms as specified by the purchaser:
 - Type I - White granular or crystalline material
 - Type II - Granular Anhydrous material
- b) This material shall be suitable for various washing, cleaning, and scouring processes, with or without soap as conditions demand, and where a moderately strong alkaline material is desired.
- c) This material may be hazardous if not properly managed.
- d) Precautionary information for the safe use, storage, and disposal of this material should be preliminarily obtained from suppliers and others.
- e) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.
- f) Sodium Metasilicate shall be purchased by net weight.

2. CHEMICAL COMPOSITION

Sodium Metasilicate, as received shall conform to the requirements as to chemical composition prescribed in Table 1.

TABLE 1 Chemical Requirements

	Type		Type II	
	min	max	min	max
Sodium metasilicate:				
Calculated as Na ₂ SiO ₃ •5H ₂ O,%	98.0	...	...	...
Calculated as Na ₂ SiO ₃,%	...	...	91.5	...
Total alkalinity to methyl orange, as Na ₂ O,%	28.5	30.0	50.0	52.0
Total silica as SiO ₂ ,%	27.5	29.0	45.0	...
Matter insoluble in water,%	...	0.2	...	0.3
Carbonates as CO ₂ ,%	...	1.2	...	2.0

G. TYPE B, CLASS 2 - SODIUM POLYPHOSPHATES

1. General Requirements

- a) Sodium polyphosphate shall be visibly free from foreign matter and suitable for its intended use.
- b) Intended use - Sodium polyphosphates covered by this specification are intended for use in industrial water treatment but are not intended for use in water for human consumption. They form soluble complexes with calcium and magnesium and may be used to soften water and control scale formation in condensers, heat exchangers, pipelines, and boilers. Sodium polyphosphates are interchangeable for the intended use, but possess the differences indicated below. Selection of the type and form should depend upon established patterns of usage, compatibility with equipment, and economic advantage.
 - (1) Type I. - Sodium tetrakisphosphate is primarily intended for use in water treatment for laundries.
 - (2) Type II. - Sodium hexametaphosphate is primarily intended for use in the treatment of boiler feedwater. This type is commonly used for the threshold treatment of industrial water. In those cases where the use of this type requires the addition of a relatively large quantity of caustic soda or soda ash, type III might be preferred.

- (3) Type III - Sodium tripolyphosphate is intended for use as a substitute for types I or II whenever it is determined to be necessary for performance or economically advantageous.
 - c) This material may be hazardous if not properly managed.
 - d) Precautionary information for the safe use, storage, and disposal of this material should be preliminarily obtained from suppliers and others.
 - e) In case of personal accident with this material, apply appropriate first aid; telephone the nearest Poison Control Center for assistance, and get medical attention immediately.
 - f) Sodium Polyphosphates shall be of the following forms:
 - Form 1 - Powder
 - Form 2 - Granular (crushed)
 - Form 3 - Plate
 - g) Sodium Polyphosphates shall be purchased by net weight.
2. Chemical Composition

Sodium Polyphosphates, as received, shall conform to the following requirements as to chemical composition:

Requirement	I	Type II	III
Total P ₂ O ₅ , weight percent, minimum	62.8	66.5	56.0
pH, 1 percent solution	7.2 - 8.3	6.6 - 7.3	9.3 - 10.4
Matter insoluble in water, weight percent, maximum	0.1	0.1	0.1

IV. WARRANTY

The contractor warrants to the owner that all chemicals furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any chemical which by reason of defective material or workmanship shall fail this specification. Such replacement shall be free of any charge to the owner or his representative.

V. SERVICE, PARTS AND MANUALS

This section is not applicable.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

All chemicals in this specification may be sampled and analyzed in accordance with ASTM Methods D 501-89, D 1122-58 and D 1193-72, whichever is applicable. The purchaser reserves the right to use any additional available information to ascertain whether the material conforms to specification.

VII. DELIVERY AND PAYMENT

Delivery of and payment for commodities under this specification shall be in accordance with the terms and conditions of the Invitation for Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

VIII. ORDERING DATA (For Purchaser's Use Only)

A. OPTIONS

Purchasers should exercise any desired option offered herein and should specify the following in the requisition and Invitation for Bids:

1. Type A, Class 1 - Ammonium Hydroxide (Household Ammonia)
 - a) Title, number, and date of this specification
 - b) Size of containers
 - c) Method of packing and shipping

2. Type A, Class 2 - Caustic Soda (Anhydrous)
 - a) Title, number, and date of this specification
 - b) Whether 1) Coarsely powdered form, or 2) flake form
 - c) Size of containers
 - d) Method of packing and shipping

3. Type A, Class 3 - Soda Ash
 - a) Title, number, and date of this specification
 - b) Whether 1) Light, or 2) dense in form
 - c) Size of containers
 - d) Method of packing and shipping

4. Type A, Class 4 - Sodium Bicarbonate
 - a) Title, number and date of this specification
 - b) Size of containers
 - c) Method of packing and shipping

5. Type A, Class 5 - Trisodium Phosphate (Anhydrous)
 - a) Title, number and date of this specification
 - b) Anhydrous Form
 - c) Size of containers
 - d) Method of packing and shipping

6. Type B, Class 1 - Sodium Metasilicate
 - a) Title, number, and date of this specification
 - b) Whether 1) Type I - White granular or crystalline, or 2) Type II - Granular Anhydrous in form
 - c) Size of containers
 - d) Method of packing and shipping

7. Type B, Class 2 - Sodium Polyphosphates
 - a) Title, number, and date of this specification
 - b) Whether

1)	Type I - Sodium Tetrphosphate,
2)	Type II - Sodium Hexametaphosphate, or
3)	Type III - Sodium Tripolyphosphate
 - c) Whether form 1 (powder), form 2 (granular), or form 3 (plate)
 - d) Size of containers
 - e) Method of packing and shipping

B. DESCRIPTION AND COMMODITY NUMBERS

1. Type A. General Cleaners

<u>Class</u>	<u>Description</u>	<u>Commodity No.</u>
1	Ammonium Hydroxide	180-12-30
2	Caustic Soda (Anhydrous)	180-58-16
3	Soda Ash	180-24-75
4	Sodium Bicarbonate	180-24-80
5	Trisodium Phosphate (Anhydrous)	180-74-83

2. Type B. Laundry Uses

<u>Class</u>	<u>Description</u>	<u>Commodity No.</u>
1	Sodium Metasilicate	505-57-78
2	Sodium Polyphosphates	180-74
	Type I. Sodium Tetrphosphate	180-74-75
	Type II. Sodium Hexametaphosphate	180-74-77
	Type III. Sodium Tripolyphosphate	180-74-80