

METRIC
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A-A-59231A  
17 January 2007  
SUPERSEDING  
A-A-59231  
1 October 1998

## COMMERCIAL ITEM DESCRIPTION

### ETHANOLAMINES (MONOETHANOLAMINE AND TRIETHANOLAMINE), TECHNICAL

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. **SCOPE.** This commercial item description (CID) covers technical grades of modified commercial monoethanolamine and triethanolamine. Monoethanolamine is intended for use as a decontaminant for riot control agent CS (orthochlorobenzylidene malononitrile) and for the chemical agent CS1 dispersing equipment. Monoethanolamine is also intended for the removal of carbon dioxide from air, other gases, and liquids by absorption. Triethanolamine is intended for use when an organic base is required, as in maintaining alkalinity of water solutions to prevent corrosion in such equipment as boilers, pipes, and radiators.

2. **CLASSIFICATION.** The ethanolamines shall be of the following types as specified (see [7.3\(b\)](#)):

2.1 Type.

Type I - Monoethanolamine (MEA)  
Type II - Triethanolamine (TEA)

### 3. SALIENT CHARACTERISTICS

3.1 Appearance. Ethanolamines shall be clear, viscous, and free of suspended matter in the liquid state when tested as specified in [3.3.1](#). When in solid form, ethanolamines shall have a white, crystalline appearance, without visual evidence of impurities or discoloration.

3.2 Chemical and physical characteristics. Ethanolamines shall conform to the chemical and physical characteristics of [table I](#) when tested as specified herein.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data that may improve this document should be sent to: <a href="mailto:STDZNMGT@dla.mil">STDZNMGT@dla.mil</a> or Defense Supply Center Richmond (DSCR), ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616.
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TABLE I. Chemical and physical characteristics.

Characteristics	MEA	TEA	Test paragraph
Specific gravity at 20 °C/20 °C (percent min.)	1.017 to 1.021	1.124 to 1.129	<a href="#">3.3.2</a>
Percent by volume distilled between 165 °C and 175 °C	90 minimum	-	ASTM D 86
Color (Platinum-Cobalt scale)	15 maximum	40 maximum	ASTM D 1209
Water content (percent by weight)	0.30 maximum	0.20 maximum	ASTM E 203
MEA content (percent by weight)	99.0 minimum	0.50 maximum	<a href="#">3.3.3</a>
TEA content (percent by weight)	0.20 maximum	99.0 minimum	<a href="#">3.3.3</a>
Diethanolamine (DEA) content (percent by weight)	0.50 maximum	0.50 maximum	<a href="#">3.3.3</a>

3.3 Tests. See [7.5](#) for sampling and testing precautions. Water, in accordance with ASTM D 1193, "Standard Specification for Reagent Water", and reagent grade chemicals shall be used throughout the tests. Where applicable, blank determinations shall be run and corrections applied where significant. Tests shall be conducted as follows:

3.3.1 Appearance. Thoroughly mix the specimen and transfer 25 milliliters (mL) into a 50 mL test tube. Stopper the test tube and allow it to stand until the bubbles have disappeared completely. Examine by transmitted light for uniformity and for freedom from particles and foreign matter.

3.3.2 Specific gravity. Measure the specific gravity of types I and II ethanolamine specimens at 20 °C/20 °C. Determine with a digital density meter calibrated to give the apparent specific gravity at the specified conditions or a specific gravity balance (chainomatic) adjusted to give a 1.000 value for the specific gravity of water at 20 °C. Other approved methods per ASTM A 891, "Standard Specification for Precipitation Hardening Iron Base Superalloy Forgings for Turbine Rotor Disks and Wheels", may be used.

### 3.3.3 MEA, TEA and DEA content.

3.3.3.1 Apparatus. Use a gas chromatographic method with temperature programmer, split injection system, capillary or packed column, flame ionization (FID) or thermal conductivity detector, and recorder, or other equivalent instrumentation and equipment for MEA, TEA and DEA content analyses.

3.3.3.2 Chromatographic conditions. Recommended conditions for a gas chromatograph (GC) using a fused silica capillary column and a FID are shown in [table II](#). Other equivalent instrumentation or GC column and detector may be used, but may require modification of

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conditions in order to obtain good peak shapes, adequate resolutions, and appropriate retention times.

TABLE II. Chromatographic conditions.

Characteristic	Condition
Column material	5.0 micron fused silica
Column dimensions	30 m (0.32 mm ID)
Column temperature	60 °C to 270 °C at 10 °C/min.*
Injector temperature	250 °C
Detector temperature	280 °C
Carrier gas	Helium
Carrier gas flow rate	2.0 mL/min.

\* 60 °C held for 3 minutes, then programmed to 270 °C at 10 °C/min., and held for 10 minutes.

3.3.3.3 Standard solutions. Use MEA, DEA and TEA of no less than 99.0 percent by weight purity in preparing the standard solutions. At least one standard solution shall be prepared with concentrations near the required levels as shown in [table I](#). If multiple standard solutions are used, they shall bracket the requirements shown in [table I](#). For MEA testing, the standard solution shall be prepared to be approximately 0.50 percent DEA and 0.20 percent TEA with the remainder being MEA. For TEA testing, the standard solution shall be prepared to be approximately 0.50 percent DEA and 0.50 percent MEA with the remainder being TEA. The three peaks shall exit in the following order: MEA, DEA and TEA. Repeated injections of the standard solution shall be passed through the GC until the main peak areas are each reproducible to within 2 percent of the average result (for each peak). Additional trace peaks shall be present, but the area of those peaks shall not be greater than 10 percent of the area of either of the two minor peaks. This procedure gives the response factor of the GC apparatus for all three ethanolamines at the appropriate concentrations. Response factors may not be constant over a large range of concentrations and should either be determined for several concentrations or at the expected concentration of the samples to be analyzed. Standard solutions can also be made with the ethanolamines in a solvent such as 2-propanol. In that case, the actual samples of product under test must also be prepared with the same dilution so that the concentration of primary component (MEA or TEA) in the solvent is the same as that in the standard solutions.

3.3.3.4 Procedure. Ethanolamines are sensitive to oxygen present in the GC carrier gas. Use a high purity grade of helium carrier gas. In addition, it is recommended that an oxygen/moisture trap be installed in the carrier gas feed prior to the GC. Repeatedly inject identical volumes of the sample into the GC until the areas of the three main peaks are each reproducible to within 2 percent of the average result for each peak. Calculate the average peak area for the three major peaks. If diluted standards were prepared in step [3.3.3.3](#), then identical dilutions shall be prepared with the samples prior to analysis.

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3.3.3.5 Calculations. Calculate the percent by weight of MEA, DEA and TEA as follows:

$$\text{Percent by weight MEA in sample} = C1 \times A1 / S1$$

where: C1 = percent by weight of MEA in standard  
 A1 = average MEA peak area of sample  
 S1 = average MEA peak area of standard

$$\text{Percent by weight DEA in sample} = C2 \times A2 / S2$$

where: C2 = percent by weight of DEA in standard  
 A2 = average DEA peak area of sample  
 S2 = average DEA peak area of standard

$$\text{Percent by weight TEA in sample} = C3 \times A3 / S3$$

where: C3 = percent by weight of TEA in standard  
 A3 = average TEA peak area of sample  
 S3 = average TEA peak area of standard

#### 4. REGULATORY REQUIREMENTS

4.1 Marking, packaging, and labeling. Material shall be labeled, packed, and marked in accordance with Title 49, Code of Federal Regulations (CFR) paragraphs 100 to 185.

4.2 Recycled materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practical, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4.3 Material safety data sheet (MSDS). The manufacturer shall comply with requirements set forth by the Hazardous Communication Standard 29 CFR paragraph 1910.1200 (d) through (g). All MSDSs submitted shall comply with provisions of FED-STD-313, "Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities".

#### 5. PRODUCT CONFORMANCE PROVISIONS

5.1 Product conformance. The products provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The government reserves the right to require proof of such conformance.

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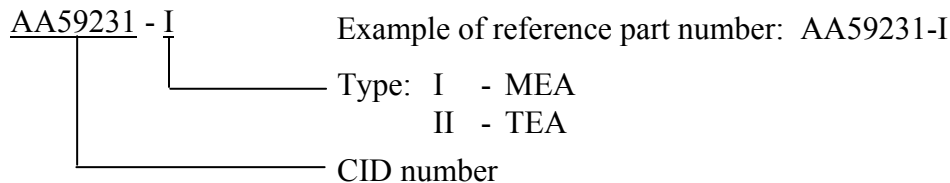
5.2 Market acceptability. The following market acceptability criteria are necessary to document the quality of the product to be provided under this CID:

- a. The item offered must have been sold to the government within the past 2 years.
- b. The company must be able to show test data or lab results of meeting the salient characteristics of the ethanolamines.

6. **PACKAGING**. Preservation, packing, and marking shall be as specified in the acquisition order (see 7.3(c)).

## 7. NOTES

7.1 Part or identification number (PIN). The following PIN procedure is for government purposes and does not constitute a requirement for the contractor.



## 7.2 Sources of documents.

7.2.1 CFR and FAR. Copies of CFR and FAR may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. Electronic copies of CFR documents may be obtained from <http://www.gpoaccess.gov/cfr/>. Electronic copies of FAR documents may be obtained from <http://www.arnet.gov/far/>.

7.2.2 Federal standards. Copies of federal standards may be obtained from General Services Administration, Federal Supply Service, Specification Section, 470 East L'Enfant Plaza SW, Suite 8100, Washington, DC 20407. Electronic copies of federal standards may be obtained from <http://assist.daps.dla.mil/>.

7.2.3 ASTM standards. Copies of ASTM standards may be obtained from the ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959. Electronic copies of ASTM standards may be obtained from <http://www.astm.org/>.

7.3 Ordering data. The acquisition order should specify the following information:

- a. CID document number, revision, and CID PIN.
- b. Type of ethanolamine required (see 2).
- c. Packaging requirements (see 6).
- d. Unit of issue and quantity.

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7.4 Cross-reference data. Table III provides a cross-reference between the A-A-59231 and MIL-E-50011 types for each assigned NSN.

TABLE III. Cross-reference of A-A-59231 to MIL-E-50011 types.

NSN	A-A-59231 Type	MIL-E-50011 Type
6810-00-075-6876	I	I
6810-00-270-6207	I	I
6810-00-281-2192	II	III
6810-00-922-0866	I	I

7.5 Sampling and testing precautions. This CID requires inspection and use of chemical material which is potentially dangerous to personnel. All applicable safety rules, regulations, and procedures must be followed in the sampling and testing of this material.

7.6 Significant figures. For the purpose of determining conformance with this CID, an observed or calculated value should be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM E 29, "Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specification".

7.7 Subject term (key word) listing.

Chemical agent CS1  
Gas chromatograph  
MEA  
Riot control agent CS  
TEA

MILITARY INTERESTS:

Custodians:  
Army - CR4  
Navy - SH  
Air Force - 68

Review Activity:  
Army - SM

CIVIL AGENCY  
COORDINATING ACTIVITY:

GSA - FSS

Preparing Activity:  
DLA - GS3

(Project 6810-2006-005)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <http://assist.daps.dla.mil/>.