[INCH-POUND]
A-A-50566
May 25, 1998
SUPERSEDING
MIL-M-29190A(YD)
29 August 1986

COMMERCIAL ITEM DESCRIPTION

MONITORING DEVICES, EMISSION; STACK RELATED

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 emission monitoring devices for exhaust smoke stacks.

2. CLASSIFICATION. The monitoring devices shall be of the following types and classes, as specified (see 7.2):

TYPE

Type I	-	Opacity monitor.
Type II	-	Sulfur dioxide monitor.
Type III	-	Nitrogen oxides monitor.
Type IV	-	Sulfur dioxide and nitrogen oxide monitor.
Type V	-	Oxygen monitor.
Type VI	-	Data monitor.

Class A	-	Chart recorder.
Class B	-	Data acquisition system.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 15E2), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6630

3. SALIENT CHARACTERISTICS.

3.1 Description. Continuous emissions monitoring (CEM) of gases and particulate matter from smoke stacks is accomplished by monitoring devices which analyze gas samples. These monitoring devices ensure that emissions are at acceptable levels and that combustion efficiency is at optimum levels. Emission monitoring devices include stack probes and opacity monitors. CEM analysis provides real-time readout of temperatures, pressures, flows, voltages, and currents, in addition to gas concentrations. Data is processed through acquisition and handling systems. Types II, III, and IV monitors with automatic calibration shall be used in larger plant installations (250,000,000 British thermal units (Btu)) (263 764 000 kilojoule (kJ) and larger) and should not be ordered for smaller plants.

3.1.1 Performance. When required by plant size to be monitored, the monitoring devices shall be in conformance with federal, state, and local regulations in effect on the date of invitation for bids or request for proposal. Routine maintenance, repair, and replacement of component parts and modules shall be capable of being performed by journeyman boiler plant operators and journeyman electronic technicians. Monitoring devices specified for use on 250,000,000 Btu (263 764 000 kJ) and larger plants shall meet the requirements of 40 CFR part 60, appendix B, performance specifications 1, 2, and 3. Installation, plant size, location, duct/stack type and diameter, gas temperature range, corrosive components, condensate, surface and distance between the sensor(s), control unit(s) or data acquisition system shall be as specified (see 7.2).

3.2 Standard commercial product. The monitoring devices and data acquisition systems shall, as a minimum, be in accordance with the requirements of this CID and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this CID but which are a part of the manufacturer's standard commercial product, shall be included in the monitoring devices and data acquisition systems being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model.

3.3 Interface. A monitoring device specified for one location shall be compatible with same make monitoring devices of other types at that location. When specified (see 7.2), the monitoring device shall interface with existing equipment. The makes, models, and types of existing monitoring devices shall be specified (see 7.2).

3.4 Emission monitoring devices.

3.4.1 Type I, opacity monitor. The type I opacity monitor when used in conjunction with a data acquisition system, shall as a system, conform to the requirements of 40 CFR part 60, appendix B, performance specification 1. The system shall be tailored to perform as specified herein.

3.4.1.1 Control unit light display. The control unit shall provide a minimum of "clear," "warning," and "violation" display lights. Independent controls shall be provided for adjusting

warning and violation light activation from 0 to 100 percent opacity and 0- to 90-second delay to prevent momentary false alarms.

3.4.1.2 Control unit meter display. The control unit meter display shall be analog or digital unless one type is specified (see 7.2). If analog display is used, it shall conform to the requirements of ANSI C39.1. The scale shall be graduated linearly from 0 to 100 percent opacity in 2 percent increments. If a digital display is used, it shall conform to the requirements of ANSI C39.6. The numerals shall indicate the percent opacity from 0 to 100 percent in percent increments. The numerals shall be distinguishable at a distance of not less than 6 feet (1.82 metre). The meters shall be accurate within ± 2 percent of full scale.

3.4.1.3 Relay contacts. The relay contacts shall be single-pole, single throw hermetically sealed contacts, not less than 5 amperes, 120-volt, 60 Hertz shall be provided for the visual warning signals and when specified (see 7.2), audible warning signals. The system shall warn of filter blockage, blower motor failure, window soilage, failure in the opacity monitor, and when opacity limits are exceeded.

3.4.1.4 Analog outputs. The control unit (monitor) shall provide 4-20 milliampere outputs suitable for driving type VI data monitors.

3.4.1.5 Stack mounted equipment. The stack mounted equipment, used in conjunction with the monitoring devices shall perform the measurements in situ without any sample extraction or conditioning. Stack mounted equipment shall be equipped with an air purge system providing filtered, moisture/oil free air for minimizing the amount of dirt and dust on the optical windows. Continuous long term sealed protection shall be provided for optical lenses or reflective surfaces which could be damaged or rendered ineffective due to exposure to the stack gas stream in the event of air purge system failure. When specified (see 7.2), opacity monitors shall have provisions to automatically switch to a stand-by air supply (plant air), in the event of air purge system failure, and the system shall continue to monitor opacity. The air purge system shall be equipped with easily replaceable filters. The maximum stack pressure for the air purge system shall be as specified (see 7.2). Outdoor mounted systems shall be protected from the elements and inclement weather by NEMA 250, type 4, completely sealed weather covers. The light source shall have not less than 20,000 hours of in-use life.

3.4.1.6 Mounting hardware. Adjustable adapter flanges, thermal insulating blocks, and mounting hardware shall be included for simple, precise optical alignment.

3.4.1.7 Jet engine test cell. When specified for use on a jet engine test cell (see 7.2), the monitoring device shall meet the requirements for performance in accordance with the applicable part of 40 CFR part 60.

3.4.1.8 Calibration. When required by federal, state, and local regulations, the monitoring device shall perform automatic on-stack zero/span calibration without requiring personnel check and at selected intervals in accordance with local CFR requirements. A manual override at the control unit shall permit manual activation for zero/span calibration at any time by the operator without

boiler shutdown. The opacity monitor calibration error shall be not greater than 3 percent opacity. Zero and calibration drift shall be not greater than 2 percent opacity in 24 hours. Response time shall be not greater than 90 percent in 10 seconds.

3.4.2 Type II, sulfur dioxide monitor; type III, nitrogen oxides monitor; and type IV, sulfur dioxide and nitrogen oxides monitor. The type II sulfur dioxide, type III nitrogen oxides monitor, and type IV sulfur dioxide and nitrogen oxides monitor used in conjunction with a type VI data monitor, when required, shall as a system, conform to the requirements of 40 CFR part 60, appendix B, performance specification 2.

3.4.2.1 Calibration. When required by federal, state, and local regulations, the monitoring devices shall perform automatic on-stack zero and span calibration at selectable intervals of 1, 2, 4, 8, and 24 hours. A manual override at the control unit shall permit manual activation for zero and span calibration at any time by the operator.

3.4.2.2 Control unit light display. The control unit light display shall provide no less than “warning” and “violation” lights. Independent controls shall be provided for adjusting warning and violation light actuation from 0 to full scale parts per million (ppm) and 0- to 90-second delay to prevent momentary false alarms.

3.4.2.3 Control unit meter display. The control unit meter display shall conform to the requirements of 3.4.1.2 except that graduations shall read ppm with not less than two switch selectable ranges, i.e., 0 to 1000, 0 to 3000 ppm. Range of meter shall be as specified (see 7.2).

3.4.2.4 Relay contacts. The relay contacts described in 3.4.1.3 shall be provided for visual display and, when specified (see 7.2), audible warning signals.

3.4.2.5 Analog outputs. The control unit (monitor) shall provide 4-20 milliampere outputs suitable for driving type VI data monitors.

3.4.2.6 Stack mounted equipment. The monitoring device shall perform the measurements in situ. If the measurement technique is variable with stack gas temperature, the measurement output shall automatically compensate for these variations. The monitor shall also measure stack temperature. Stack and outdoor mounted components shall be protected from the elements and inclement weather by NEMA 250 type 4 completely sealed weather cover.

3.4.3 Type V, oxygen monitor. The type V oxygen monitor used in conjunction with a type VI data monitor, when required, shall as a system, conform to the requirements of 40 CFR part 60, appendix B, performance specification 3. The monitor shall perform the measurement in situ, without any sample extraction or conditioning and shall be capable of providing automatic trim control and providing increased response with decreased oxygen in the stack.

3.4.3.1 Calibration. When required by federal, state, and local regulations the monitor shall perform automatic on-stack zero/span calibration without personnel check and at selected intervals in accordance with local CFR requirements. A manual override at the control unit shall

permit manual activation for zero/span calibration at any time without boiler shutdown. Calibration error shall be within ± 0.2 percent and the response time shall be 90 percent in 8 seconds. Zero/calibration drift shall be not greater than 0.3 percent over a 24-hour period.

3.4.3.2 Control unit light display. The control unit light display shall provide no less than low oxygen, early warning, and alarm. Independent controls shall be provided for adjusting "warning" and "alarm" light activation from 0 to full scale, and 0- to 90-second delay to prevent momentary false alarms.

3.4.3.3 Control unit meter display. The control unit meter display shall conform to the requirements of 3.4.1.2, except that graduations shall read 0 to 20.9 percent oxygen in 0.1 percent increments (see 7.2).

3.4.3.4 Relay contacts. Relay contacts described in 3.4.1.3 shall be provided for visual display and, when specified (see 7.2), audible warning signals.

3.4.3.5 Analog outputs. The control unit (monitor) shall provide 4-20 milliampere outputs suitable for driving type VI data monitors and fuel/air controller.

3.4.3.6 Stack mounted equipment. Stack and outdoor mounted components or systems shall be protected from the elements and inclement weather by NEMA type 12 or equivalent, completely sealed weather covers.

3.4.3.7 Probe. The stack probe shall be equipped with industrial duty flame arrestors to prevent flame propagation and flash-back in the probe unit. The probe shall extend not less than one-third of the diameter of the stack or duct, at the point of measurement. The probe shall be corrosion-resistant and include filter, deflectors, and/or airfoils to minimize accumulation of particulates from the process gas.

3.4.4 Type VI data monitors. The type VI data monitors, when used in conjunction with the type I through type V monitors, shall as a system, measure the output from the monitors and record the data and generate reports when required by applicable federal, state, and local agencies without operator intervention.

3.4.4.1 Class A, chart recorder. The recording chart shall move no slower than 0.75-inch per hour (19.05 millimetre (mm) per hour) and be of sufficient length for not less than a 31-day continuous record. The movement of the recording mechanism shall be free and smooth and the pen shall produce a continuous record. Means shall be provided for adjusting the zero-position of the pen point and for minor recalibration. The pen shall be for marking on chart paper and shall not abrade the chart. Means shall be provided to move the pen away from the chart and to prevent it from returning to the chart until manually returned. The overall accuracy of the recorder shall be within ± 1.5 percent of full scale.

3.4.4.2 Indicator. The recorder shall incorporate a separate indicating pointer or colored band(s) with a scale not less than 6 inches (152 mm) long, or a 5-digit display with 2 decimal places.

Digits shall be not less than 1.00-inch (25.4 mm) high of color to contrast with surrounding background.

3.4.4.3 Pen-movement mechanism. The pen-movement mechanism shall be actuated by mechanical or pneumatic power transmitted by direct mechanical or pneumatic connection from the analyzing system. The mechanism can also be actuated by electrical power controlled by a signal from the analyzing system in such a way that performance shall be within the limits specified.

3.4.4.4 Pneumatic transmission. When required in the design, the connectors and other fittings shall be of a type which allow joints to be made leakproof without putting strain on the equipment.

3.4.4.5 Electrical recorders. Electrical recorders shall operate when activated by a signal from the analyzing system without appreciable lag. The electrical recorders shall position the recording and indicating element without causing hunting, cycling, or overtravel of the recording and indicating element. Electric motors shall be fully enclosed and shall be equipped with permanently lubricated antifriction bearings. Sliding-contact pairs shall have low and constant contact resistance and give long contact-life with negligible wear.

3.4.5 Data acquisition system. The data acquisition system used in conjunction with types I through V monitors shall, as a tailored system, accept the outputs from stack monitors, integrate the information and permanently record the information. When required, the data acquisition system shall generate reports in the format required by applicable federal, state, and local agencies without operator intervention. The data acquisition system shall include means by restrictive password, key, or hidden switch to edit reasons for faults before generating reports without altering opacity values or times.

3.4.5.1 Data protection. The data acquisition system shall have protection for components from damage due to spike voltage, and loss of data due to power failure.

3.4.5.2 Number and type of monitors. The number and type of monitors attached to the data acquisition system shall be as specified (see 7.2).

3.6 Electrical. The equipment shall be suitable for operation from a single phase 120 Volt, 60 Hz power supply conforming to the requirements of NFPA 70. Variations of voltages between ± 10 percent of the base power supply voltage shall not cause the equipment to operate outside the limits of performance specified.

4. REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials

produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of ASTM SI-10 (IEEE/ASTM SI-10), and all other requirements of this commercial item description including form, fit, and function are met. If a product is manufactured to metric dimensions and those dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting of rejecting the product.

5. QUALITY ASSURANCE PROVISIONS.

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

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Source of documents.

7.1.1 The Code of Federal Regulations (CFR) and Federal Acquisition Regulation (FAR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.1.2 ANSI Standards are available from the American National Standards Institute, 11 West 42nd Street New York, NY 10036.

7.1.3 ASTM Standards are available from the American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

7.1.4 NEMA Standards are available from the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.

7.1.5 IEEE Standards are available from the Institute of Electrical and Electronics Engineers (IEEE), IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

7.2 Ordering data. Acquisition documents should specify the following:

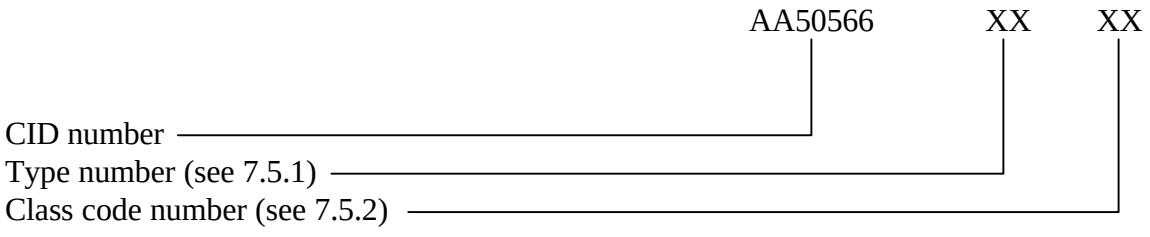
a. Title, number, and date of this CID.
b. Type and class of monitoring devices required (see 2. and 3.4.5.2).
c. Size, geographic location, and required factors of plant to be monitored (see 3.1.1).
d. Make, model, and type of existing equipment to be interfaced with at each location (see 3.3).
e. When specific type meter display and range is required (see 3.4.1.2, 3.4.2.3, and 3.4.3.3).
f. When the warning system shall include audible warning signals (see 3.4.1.3, 3.4.2.4, and 3.4.3.4).
g. Maximum stack pressure for the air purge system, stand-by plant switchover and connection provisions, and other factors affecting installation (see 3.4.1.5).
h. When type I is to be used on a jet engine test cell stack (see 3.4.1.7).
i. Number and type of monitors to be attached to the type VI, data monitor (see 3.4.5.2).

7.3 Supersession data. This CID replaces Military Specification MIL-M-29190A(YD), dated 29 August 1986.

7.4 Classification cross reference. Cross reference of classification changes between this CID (see 2.) and the superseded Military Specification MIL-M-29190A(YD), is as follows:

MIL-M-29190A(YD)		A-A-50566
Type I	Opacity monitor	No change
Type II	Sulfur dioxide monitor	No change
Type III	Nitrogen oxides monitor	No change
Type IV	Sulfur dioxide and nitrogen oxide monitor	No change
Type V	Oxygen monitor	No change
Type VI	Data monitor	No change
Class A	Chart	Class A Chart recorder
Class B	Data processor	Class B Data acquisition system

7.5 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PIN to be used for items acquired in this description are created as follows:



7.5.1 Type. The type of monitoring devices (see 3.4.1, 3.4.2, 3.4.3, and 3.4.5) are identified by a two-digit number (see table I).

TABLE I. Code number to type.

Type	Noun name	Type code no.
I	Opacity monitor	01
II	Sulfur dioxide monitor	02
III	Nitrogen oxide monitor	03
IV	Sulfur dioxide and nitrogen oxide monitor	04
V	Oxygen monitor	05
VI	Data monitor	06

7.5.2 Class. The class of the monitoring device (see 3.4.4.1 through 3.4.5.2) are identified by a two-digit number (see table II).

TABLE II. Code number for class.

Class	Name	Class code
A	Chart recorder	11
B	Data acquisition system	22

7.6 Metric units. The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system should be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

MILITARY INTERESTS:

Custodians:
Army - EA
Navy - YD1

Review Activities:
Navy - MS
DLA - DP

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FSS

Preparing Activity:
Navy - YD1

(Project 6630-0566)

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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	A-A-50566	980525

3. DOCUMENT TITLE

MONITORING DEVICES, EMISSION; STACK RELATED

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

a. NAME	b. TELEPHONE *Include Area Code)*
RUSSELL REYNOLDS	(1) Commercial 805-982-5946 (2) AUTOVON 551-5946
c. ADDRESS *(Include Zip Code)* COMMANDING OFFICER, NCBC CODE 15E2C 1000 23RD AVENUE PORT HUENEME, CA 93043-4301	**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:** DEFENSE QUALITY AND STANDARDIZATION OFFICE 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22401-3466 Telephone (703) 756-2340 AUTOVON 289-2340