

Umatilla Chemical Agent Disposal Facility

ATTACHMENT 13

ENHANCED ON-SITE CONTAINER (EONC) SPECIFICATION

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ENHANCED ON-SITE CONTAINER SPECIFICATION

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GENERAL REQUIREMENTS, ENHANCED ON-SITE CONTAINER (EONC) (U)

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1. GENERAL

1.1. Background, General Description.

- a. The Enhanced On-Site Containers (EONC) have been designed to provide the safe transportation of lethal chemical munitions. Its primary role is to protect munitions from the thermal and structural assault that could result from a hypothetical accident sequence, and to provide a barrier against release of significant amounts of agent. The EONC will be used for the transport of stockpiled chemical munitions over road (within the confines of the government facility) that are housed at various government sites across the United States. The route will be from munitions storage bunkers to destruction facilities by means of a specially designed trailer.
- b. The Container must have the ability to be decontaminated easily in the event of an internal leak or exposure to a contaminated environment.
- c. The principal components of the Container are:
 - (1) The frame
 - (2) The outer vessel
 - (3) The foam impact limiter/thermal barrier
 - (4) The inner containment vessel and the closure mechanism.
 - (5) The trays and inserts
- d. The primary role played by each of the above components is discussed below.
 - (1) The frame includes ISO (International Organization for Standardization) corners that provide for ease of handling. The frame is of stainless steel construction for ease of decontamination.
 - (2) The outermost stainless steel shell provides a basic function. This shell and closure mechanism when properly assembled provide an enclosure to encapsulate the foam and insulation from the environment. The thickness of the shell was designed to provide structural support, and to minimize penetration in a puncture scenario.
 - (3) The foam and ceramic fiber blanket provide the main energy-absorbing characteristics during an impact event. The thermal barrier is a combination of ceramic fiber blanket and urethane foam.

- (4) The inner containment vessel provides the primary barrier against escape of the agent to the environment. A stainless steel shroud allows for decontamination in the event of a leak during transport. Guides are provided for the proper location of the contents within the container. The closure mechanism consists of a hydraulically driven rotating ring which engages tapered wedges on the flanges of the inner containment vessel and the inner containment vessel flanged and dished head. The closure mechanism provides the force necessary to secure the door during normal transport and the hypothetical accident scenario.
- (5) Trays and inserts are used to support the munitions. The trays and inserts are designed to limit the potential damage to the Container caused by internal impacts.

e. Operations, General Description.

The EONC is normally transported on a trailer designed for use with the package. After leveling of the trailer, the access door to the mechanical interlock pin on the EONC is opened, a padlock removed from the pin, and the pin removed from the rotating locking ring. The mechanical interlock pin prevents inadvertent or unintentional rotation of the locking ring during transport.

The keyed 12vdc hydraulic power system is activated and power is provided from a connector on the trailer to the battery system on the tractor.

A pendant on a retractable cord reel contains switches to activate the three hydraulic cylinders on the system. One switch on the pendant activates two cylinders which operates the rotating locking ring and a second switch activates the hydraulic cylinder which swings the door open and closed. Lights on the pendant illuminate to indicate the position of the door and rotating locking ring.

Activation of a switch on the pendant allows the two hydraulic cylinders to drive the rotating locking ring into the open position. The movement of the rotating ring is restricted by two limit switches. One is preset to stop the rotating locking ring in the proper open position, and one is preset to stop the rotating locking ring in the proper closed position. If the limit switch which stops the rotating locking ring in the open position has not been activated, then the door open switch on the pendant cannot be activated.

After the rotating locking ring has been properly opened, the switch on the pendant which controls the door open cylinder is activated. The swing of the door is also restricted in both open and closed positions by two preset limit switches. The door open limit switch is factory preset at 120° which allows normal routine loading and unloading of the EONC. Some facility conditions may require the opening of the door to more than the preset 120° position. In these situations, a bypass valve on the hydraulic system allows the door to be manually pushed open to 165°. An additional 5° of swing is achieved by manually articulating spherical bearings contained in the door hinge system. This allows the door to be swung open to the maximum of 170°. When the door has been manually pushed into this 170° position an additional limit switch is engaged which prevents the hydraulic operation of the door swing system and an indicator light (articulate door) on the side of the hydraulic control box is illuminated.

When the door has been manually opened to the 170° position, it must be manually returned to the normal operation position. Deactivation of the articulate door limit switch is achieved by manually pushing the door back the 5° to eliminate the swing from the spherical bushings in the hinge and by manually pushing the door back to less than the 120° normal operation position. This allows the system to be hydraulically driven in the normal operation mode.

With the door in the normal open position, a tray of munitions is inserted with a forklift into the EONC between the alignment guide rails which are positioned on the inside walls of the EONC. Two tray and two insert assemblies accommodate all configurations of munitions transported by the EONC.

After loading of the munitions, the hydraulic system is again activated; the door is swung closed and the door closed limit switch engages, to allow the switch for the rotating locking ring closed cycle to be engaged. If the door closed limit switch is in the "not engaged", the rotating locking ring switch is deactivated. As the rotating locking ring is moved into the closed position, tapered wedges in the vessel flange and the door flange engage providing the necessary force to close the door in the closed position. With the rotating locking ring in the closed position, the mechanical interlock pin and padlock are replaced, the power to the hydraulic system is turned off and the leveling jacks on the trailer are retracted. The EONC and trailer are now prepared for transport.

Around the outside face of the EONC door sealing surface are two 3/8 diameter o-rings. These viton o-rings are compressed as the rotating locking ring reaches the closed position, thereby sealing the door and preventing the release of chemical agent into the atmosphere if a leak were to occur during transport. The area between the two 3/8 diameter o-rings provides a test path to leak test the door seal prior to transport. This area between the o-rings is evacuated using a mechanical vacuum pump. A pressure rise leak test ensures the EONC is properly sealed and ready for transport.

Two additional ports located on opposite sides of the EONC are used to sample the interior of the EONC to ensure no chemical agent leaks occurred during transport.

1.2. Scope.

This specification covers general product fabrication and inspection requirements for the Enhanced On-Site Container. It also provides interpretation of certain requirements specified on the drawings. Specific requirements on the drawings always take precedence over these general requirements and interpretations. This specification is applicable to customary U. S. (inch) dimensions. Unless otherwise stated, all linear dimensions are in inches in this specification.

1.3. Paragraph References.

A reference to a specification paragraph number includes all subordinate paragraphs.

1.4. Definitions.

For the purposes of this specification, the following definitions shall apply.

Design Agency.	The Design Agency is Sandia National Laboratories, Albuquerque, NM which is responsible primarily for the design, development, and evaluation of the Enhanced On-Site Container.
Buyer:	Bechtel National Inc. acting as agent for the U.S. Army Corps of Engineers.
Supplier:	The Supplier is responsible for furnishing the Enhanced On Site Container.
Subsupplier:	The subsupplier is an organization selling materials, parts, components, apparatus, or services to a supplier.

2. DOCUMENTS

The following documents form a part of this specification.

2170677	Rigid Polyurethane Foam, 4.0 to 25.0 PCF
9904301	Passivation, Corrosion Resistant Steel
9906008	Abrasive Blasting
9912117	Welding, Aluminum Alloys
9912119	Welding, Carbon, Low-Alloy, and Corrosion- Resistant Steels
9915022	Insert, Installation, Externally-Threaded, Screw-Thread
9919100	Marking, General Methods
9952037	Test Method for Determination of Char Formation and/or Intumescent Properties of Rigid Foams

ANSI/ASME B1.1 - 89	Unified Inch Screw Threads (UN and UNR Thread Form)
ANSI/ASME B1.2 - 83	Gages and Gaging for Unified Inch Screw Threads
ANSI/ASME B1.7 - 84	Nomenclature, Definitions, and Letter Symbols for Screw Threads
ANSI/B1.10 - 88	Unified Miniature Screw Threads
ANSI/ASME B1.20.3 - 91	Dryseal Pipe Threads
ANSI/ASME B1.20.1 - 83	Pipe Threads
ANSI/ASME B46.1 - 85	Surface Texture
ANSI/ASME B94.6 - 84	Knurling
ANSI/ASME Y1.1 - 89	Abbreviations for Use on Drawing and in Text
ASME Y14.5M - 94	Dimensioning and Tolerancing Engineering Drawings and Related Practices
ASME Y14.6 - 94	Screw Thread Representation Engineering Drawing and Related Documentation Practices
ANSI/AWS A2.4 - 86	Symbols for Welding and Nondestructive Testing
ANSI N14.5 - 87	Radioactive Materials Leakage Tests on Packages for Shipment
SNT-TC-1A	American Society for Nondestructive Testing recommended practice No. SNT-TC-1A
QAPP	U.S. Army Program Manager for Chemical Demilitarization, Quality Assurance Program Plan, Rev. 2, dated 8/5/96
SAE-J514-1994	Hydraulic Tube Fittings
SAE-J516-1994	Hydraulic Hose Fittings
SAE-J517-1994	Hydraulic Hose
SAE-J518-1993	Hydraulic Flanged Tube, Pipe, and Hose Connections, 4-Bolt Split Flange Type
NEMA ICS 1-1993	General Standards for Industrial Control and Systems
NEMA ICS 2-1993	Industrial Control Devices, Controllers and Assemblies
NEMA ICS 4-1993	Industrial Control and Systems, Terminal Blocks
NEMA ICS 6-1993	Industrial Control and Systems, Enclosures
NEMA MG 1-1993	Motors and Generators

3. MATERIAL VERIFICATION

Supplier shall provide Certified Material Test Reports (CMTR), with heat number traceability, where applicable, at a minimum, for the items described below:

- a. Foam, polyurethane, 5 lb/cu ft.
 1. Density: provided with each shipment, based on material batch.
 2. Compressive strength parallel to rise at 75°F: Provided with each shipment, based on material batch.
 3. Compressive strength perpendicular to rise at 75°F: Provided once as a pre-qualified property.
 4. Compressive strength parallel to rise at 255°F: Provided once as a pre-qualified property.
 5. Thermal conductivity: Provided once as a pre-qualified property.
 6. Char formation: Provided once as a pre-qualified property.
- b. Insulation, ceramic fiber blanket or microporous insulation.
 1. Density: Provided with each shipment, based on insulation set.
 2. Thickness: Provided with each shipment, based on insulation set.
 3. Thermal conductivity: Provided once as a pre-qualified property.
 4. Loss-on-ignition: Provided with each shipment, based on insulation set.
- c. Outer o-ring, viton, molded, 0.375 dia.
 1. Dimensions: Provided with each shipment, based on batch control certification.
 2. Hardness: Provided with each shipment, based on batch control certification
 3. Tensile: Provided with each shipment, based on batch control certification.
 4. Elongation: Provided with each shipment, based on batch control certification.
- d. Inner o-ring, viton, molded, 0.375 dia.
 1. Dimensions: Provided with each shipment, based on batch control certification.
 2. Hardness: Provided with each shipment, based on batch control certification
 3. Tensile: Provided with each shipment, based on batch control certification.

4. Elongation: Provided with each shipment, based on batch control certification.
- e. Closure mechanism, door
 1. flange
 2. tapered wedges
 3. hinge arms
- f. Closure mechanism, vessel
 1. flange
 2. tapered wedges
 3. rotating ring
 4. stiffening ring
 5. hinge arms
- g. Inner vessel
 1. flanged and dished heads
 2. body
- h. Outer vessel
 1. flanged and dished heads
 2. body
- i. Nut, sample port
- j. O-ring, valve stem, sample port
- k. O-ring, body, sample port
- l. Body, round, sample port
- m. Valve, stem, short, sample port
- n. ISO corner fittings
- o. Tubing, rectangular, ISO leg

4. MATERIAL RESTRICTIONS

Materials or components made of brass, bronze, and aluminum shall not be used. These materials will react to the decontamination solution. The exceptions are the trays and insert assemblies which contain aluminum.

5. WELD REPAIR

The criteria below shall be followed when supplier/subsupplier performs a weld repair. The supplier/subsupplier shall maintain records of all weld repairs detailed below. Copies of these records are to be included in the quality verification documentation package of the assembly or part.

a. Welded repairs of base metal:

For any base metal repair which exceeds 3/8" or 10% of the nominal wall thickness, whichever is less, shall be considered a major repair which requires prior approval from the Buyer. Minor repairs (those which do not exceed the lesser of 3/8 " or 10% of the nominal wall thickness) made in accordance with approved weld procedures do not require prior approval from the Buyer.

b. Repair of Class II welds:

A repair of a Class II weld does not require prior approval from the Buyer if the repair is made per approved weld repair procedures.

c. Repair of class I welds:

A major repair to a Class I weld requires prior approval from the Buyer if the repairs made after the weld had been accepted by final nondestructive examination. Minor repairs and repairs initiated as a result of in-process or final nondestructive examination, may be made without prior approval by the Buyer if the repair is made per approved procedures.

6. METAL HEAT TREATMENT REQUIREMENTS

a. When necessary to facilitate fabrication, parts made from heat-treatable alloys, for which material is specified in terms of the final temper for condition required, may be fabricated from raw stock of a temper or condition different from the final temper and then heat-treated to the specified temper or condition.

b. After the completion of in-process heat-treatment, sample parts from each heat-treat lot shall be tested to ensure the material properties influenced by heat-treatment conform to the applicable material specification requirements. If tests on actual parts are impractical, suitable samples of the same alloy and starting condition as the parts shall be heat-treated with the lot and tested for conformance to the applicable requirements.

c. Parts specified to be made from a work-hardened temper of a non-heat-treatable alloy must be fabricated from material of the required temper or condition.

d. Thermal treatments such as hot forming, stress-relieving, drying, bonding, and baking shall not be used unless specified on the drawings.

7. POST FABRICATION TESTING REQUIRED OF THE SUPPLIER

7.1. Leak Test Requirements.

After assembly of the EONC, a leak test shall be performed in accordance with ANSI N14.5. The leak rate, as determined by a pressure rise test, shall be less than 1×10^{-3} atm cc/s. This leak test is to test the o-rings and the seal surface. The area that is to be evacuated for testing is the area between the two o-rings, not the entire volume of the EONC.

7.2. Tray and Insert Test.

The trays are to be placed on an insert and statically loaded with a 10,000-pound dead weight. The criterion for passing this test is no permanent deformation of the tray or insert.

7.3. Sample Port Test (Left and Right).

After assembly of the EONC, the sample port shall be closed and leak tested per ANSI N14.5. The leak rate shall be less than 1×10^{-3} atm cc/s.

7.4. O-Ring Test Port Test.

After assembly of the EONC, the o-ring test port shall be plugged inside the EONC and leak tested per ANSI N14.5. The leak rate shall be less than 1×10^{-3} atm cc/s. It shall be established before and after this test that a free flow path exists through the port.

8. POST FABRICATION OPERABILITY TESTS REQUIRED OF THE SUPPLIER

The following tests shall be performed on each completed EONC to demonstrate correct alignment, function, and limits of the operating systems.

a. Locking Ring and Door Swing Test. Demonstrate 5 successful cycles.

The padlock and interlock pin shall be removed from the rotating locking ring.

The "power" LED on the retractable pendant is illuminated when the hydraulic power system key is engaged. The rotating locking ring shall be hydraulically moved to the "unlock" position using the switch on the pendant. Engagement of the limit switch to correctly position the rotating locking ring in the unlock position shall be demonstrated by illumination of the locking ring "unlock" LED on the pendant.

The door swing hydraulic cylinder shall be activated using the switch on the pendant to correctly position the door in the 115-120° "open" position.

Engagement of the door open limit switch shall be demonstrated by illumination of the "opened" LED on the pendant.

The door swing cylinder shall be activated using the switch on the pendant to correctly position the door in the closed position. Engagement of the door closed limit switch shall be demonstrated by illumination of the "closed" LED on the pendant.

The rotating locking ring shall be hydraulically returned to the correct locked position. Engagement of the rotating locking ring locked limit switch shall be demonstrated by the illumination of the "locked" LED on the pendant as well as engagement of the interlock pin into the rotating locking ring. This completes one cycle.

b. Hydraulic System Check.

At the conclusion of the five locking ring and door swing test series the hydraulic control box shall be opened, all hydraulic connections, ports and fittings shall be examined for leaks. Hydrostatically proof test to 5,520 psig, and hold for three minutes. All hydraulic connections, fittings and hydraulic cylinders on the EONC shall be examined for leaks. Visible evidence (fluid) of any hydraulic fluid leak will require tightening or replacement of the affected hardware and demonstration of 5 additional cycles described in (a.) above.

c. Manual Bypass Door Operation. Demonstrate one cycle.

With the door in the 115-120° open position as described in section 1.1.e, rotate 90° the hydraulic bypass valve labeled "bypass door open" in the hydraulic control box. Manually push the door open to 165° until it contacts the mechanical stop on the hinge assembly. Continue manually pushing the door another 5° to rotate the spherical bushings in the door hinge assembly. Successful engagement of the door articulated limit switch at 170° will be indicated by the illumination of the "articulate door" light on the outside panel of the hydraulic control box. Operation of the hydraulic system using the pendant is restricted when the articulate door limit switch and indicator light are engaged. Return the bypass door open valve to the normal operation position.

Rotate 90° the hydraulic valve in the control box labeled "bypass door closed" and manually push the door back to 115-120°. Successful realignment of the door into normal operation orientation and disengagement of the articulate door limit switch shall be indicated by the loss of illumination of the "articulate door" light on the outside panel of the hydraulic control box. Reposition the bypass door closed hydraulic valve into the normal operation position. The hydraulic system will not function until the articulate door limit switch and light are disengaged. This completes one cycle.

d. **Manual Locking Ring and Door Swing Test. Demonstrate One Cycle.**

Rotate 90° the four bypass valves in the hydraulic control box labeled, "bypass door open, bypass door closed, bypass ring lock, and bypass ring unlock". Remove the padlock and interlock pin from the rotating locking ring. Open the two access ports and remove the insulation cans for the rack and pinion system. Insert two wrenches and rotate in the unlock direction as indicated on the outside of the EONC outer vessel until the rotating locking ring is fully unlocked.

Attach a portable hydraulic cylinder with manual hand pump to the attachment brackets on the lower hinge system and open the door to the 115-120° normal open position.

Return the door to the closed position using the portable hydraulic cylinder and hand pump. Lock the rotating locking ring using the two wrenches in the rack and pinion manual locking system. Insert the interlock pin. Remove the two wrenches, insert the insulation cans, and close the access ports to the rack and pinion gears. Return the four bypass valves in the hydraulic control box to their normal operating position. This completes one cycle.

9. QUALITY ASSURANCE

The quality assurance program requirements shall be implemented in accordance with the U.S. Army Corps of Engineer's Quality Assurance Program Plan (QAPP), Rev. 2, dated 8/5/96, in addition to the provisions stated in Section 5 of the Purchase Contract.

10. LOT SAMPLING FOR DESTRUCTIVE TESTING

10.1. Purpose.

The requirements of this section are intended to ensure that, through random lot testing, all units will meet the safety criteria for the Enhanced On-Site Container Program.

10.2. Lot Definition.

A production lot is defined as one year's production.

10.3. Responsibility for Testing.

The tests shall be performed and controlled by the Design Agency to provide independence of results.

10.4.

Production Units.

One of the first three units, and one unit annually thereafter, may be randomly selected, at the discretion of the Army, by the Design Agency and subjected to the prototype test sequence defined in Table 1. Failure to meet the pre- or post-test leak requirements, or deformation, or thermal test internal temperature limits will result in rejection of the effected unit. Further testing and rejection of units from the effected lot will be at the discretion of the Army.

TABLE 1 - PROTOTYPE TEST SEQUENCE

<u>Test Number</u>	<u>Description</u>
1	50,000-Pound Crush Test
2	Drop - Side
3	Puncture - CG over Outer Closure Joint
4	Thermal
5	Leak Test

The tests are defined as follows.

- a. Free Drop. A free drop of the specimen through a distance of 10 feet onto a flat, essentially unyielding surface, striking the surface in a position for which maximum damage is expected.
- b. Puncture. A free drop of the specimen through a distance of 40 inches in a position in which maximum damage is expected onto the upper end of a solid, vertical, cylindrical, mild steel bar installed on an essentially unyielding horizontal surface. The bar must be 6 inches in diameter with the top horizontal and its edge rounded to a radius of not more than 0.25 inch, and of a length as to cause maximum damage. The long axis of the bar must be vertical.
- c. Thermal. This test shall consist of exposure of the specimen, fully engulfed except for a simple support system, in a JP-8 fuel/air fire for a period of 15 minutes, minimum. The fuel source shall extend horizontally at least 3 feet beyond any external surface of the specimen, and the specimen shall be positioned 3 feet above the surface of the fuel source. The specimen may not be cooled artificially following the 15-minute exposure. The inner wall of the containment vessel shall not exceed 250°F as a result of this exposure.
- d. Crush. The specimen shall be subjected, for a period of 24 hours, to a compressive load of 50,000 pounds applied to the top of the specimen in a position in which the package would normally be transported. This test shall be applied to an undamaged specimen. No permanent specimen deformation shall result from this test.
- e. Leak Test. Prior to destructive testing a leak test shall be performed in accordance with ANSI N14.5. The leak rate shall be less than 1×10^3 atm cc/sec. After the destructive testing the leak test shall be repeated, and the leak rate shall be less than 1×10^1 atm/sec.

10.5. Significant Design Changes.

In the event of any significant design change, as determined by the Design Agency, the random lot testing specified in 10.4 will be invoked for all production units fabricated with the design change.