

## DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

## ONE-TON CONTAINERS

Headquarters, Department of the Army, Washington, D. C.  
18 May 1964

**1. Scope.** This bulletin contains information on the characteristics, use, maintenance, shipment, and storage of one-ton containers.

**2. Safety Precautions.** *a. General.* Conduct filling and transfer operations downwind from nearby personnel. Be sure that all receptacles to be filled are clean, dry, and leakproof. Make certain that all fittings are tight and that all items of equipment used are in good working condition. Be sure that personnel are thoroughly familiar with the characteristics of the chemical being handled and the equipment being used. Have first aid supplies and equipment available for instant use.

*b. Protective Clothing.* See that all personnel handling chemical agents are equipped with protective masks and protective clothing (TM 3-304).

*c. Decontamination.* Have on hand decontaminating materials and apparatus required for the chemical being handled. See TM 3-220 for information on decontamination.

*d. Special Precautions for Handling FS.* Carefully remove any resinous coating that appears in the bottoms of receptacles. This coating, which is a partially solidified rust-preventive compound, reacts slowly with FS causing dangerous pressure to build up in the receptacle after it has been filled and closed. If the coating can be only partially removed, make sure that the receptacle is vented properly until the reaction between the FS and the coating has ceased.

**Warning.** F S reacts violently with water. The reaction releases heat and causes sulfuric acid to be formed. When loading FS into a receptacle, be sure that the receptacle is dry and that personnel stay away from openings in the receptacle until any reaction subsides. Start FS flowing slowly, and stop the flow immediately if a reaction takes place. If reaction occurs upon resuming the flow, stop the filling operation; the equipment is either wet or dirty. Disassemble, clean, and dry the equipment before resuming filling.

**3. Use.** One-ton containers are used for shipping and storing liquid or gaseous chemical agents.

**4. Description and Data.** There are three types of 1-ton containers, types A, D, and E. The capacity of each type of container is approximately 170 gallons. The maximum quantity of any chemical agent that can be loaded into the containers is limited by the 3,500-pound maximum allowable gross weight. The containers will withstand a maximum internal pressure of 500 pounds per square inch.

*a. Type A.* The type A 1-ton container (fig. 1 is used primarily for shipping and storing chemical agents that are gaseous at atmospheric pressure. The container is a steel cylinder, 81 1/2 inches long, 30 1/2 inches in diameter, with 13/32-inch side walls. It weighs 1,600 pounds when empty.

\* This bulletin supersedes so much of TM 3-255, 16 September 1955, as pertains to one-ton containers.

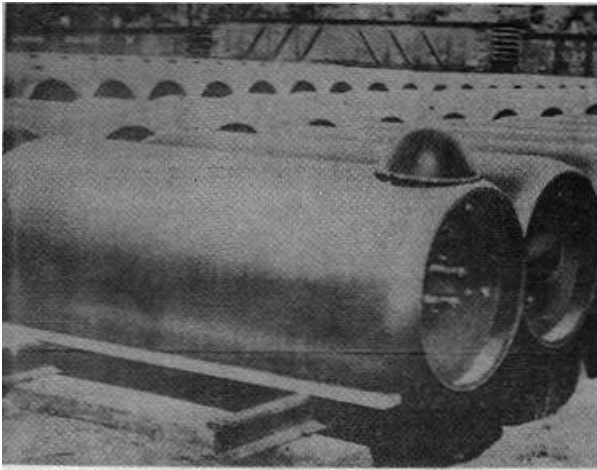
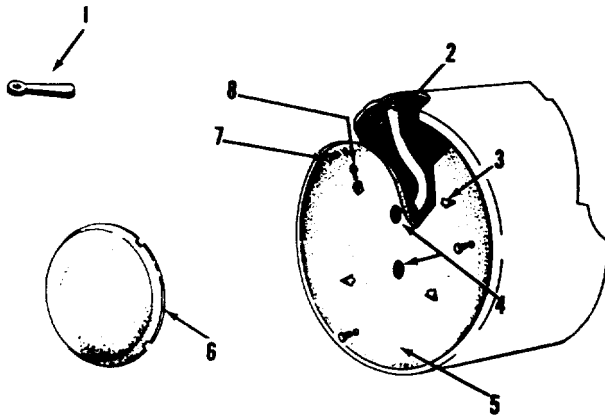


Figure 1. Type A 1-ton container.



- 1 Valve-opening wrench
- 2 Eduction tube
- 3 Bonnet clip
- 4 Eduction tube outlets
- 5 Front head
- 6 Shipping bonnet
- 7 Plug
- 8 Bonnet-locking clip

Figure 2. Front head of type A 1-ton container.

(1) *Front head.* The front head (5, fig. 2) is a concave sheet of steel three-fourths of an inch thick. Two eduction tube outlets (4), spaced 4 inches apart and threaded to receive 3/4-inch valves, are located in the middle of the front head. Three tapered plugs (7) are screwed into 3/4-inch holes spaced equally around the outer edge. When the container is filled with chlorine, fusible plugs that will melt at 175° F. are installed. When the container is filled with any other chemical agent, nonfusible plugs that will blow out at an internal

pressure of 375 pounds per square inch are installed. For protection during shipment, a metal shipping

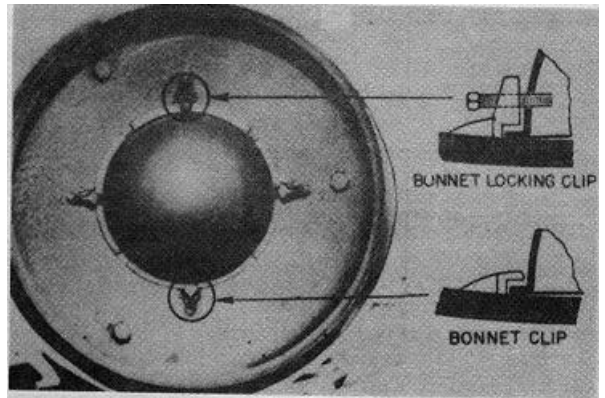


Figure 3. Shipping bonnet installed on type A or Type D 1-ton container

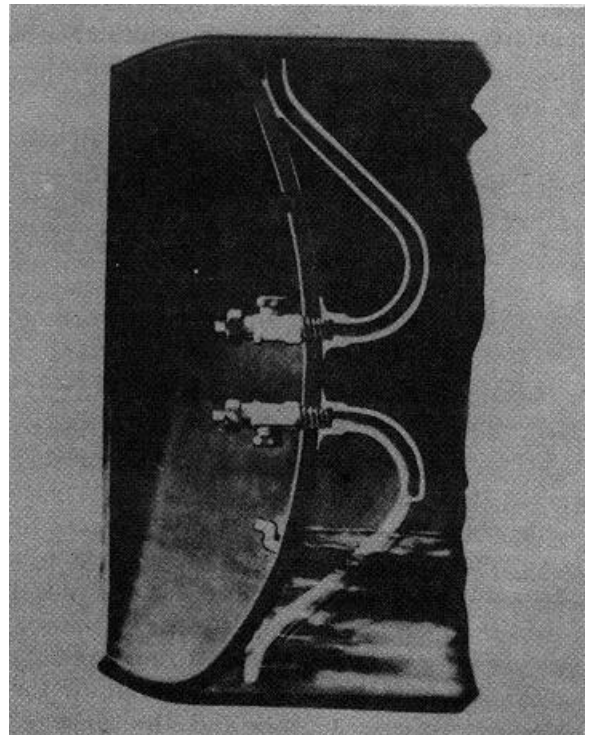
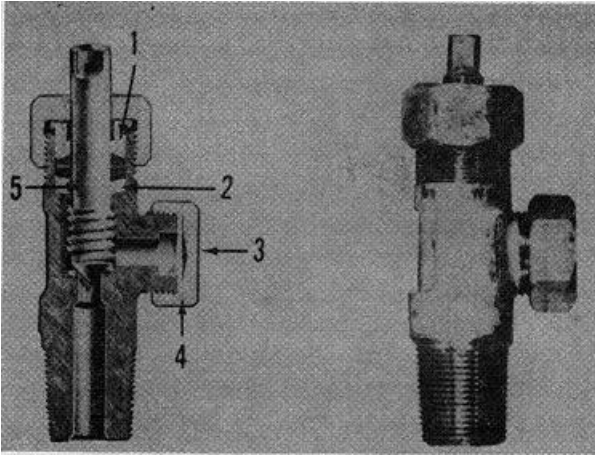


Figure 4. Eduction tubes in type A or type D 1-ton containers.



- 1 Packing gland
- 2 Packing ring
- 3 Cap
- 4 Gasket
- 5 Stem

**Figure 5. Chlorine Institute valve for 1-ton container.**

bonnet fig. 3) is fastened over the valves by three bonnet clips and a bonnet-locking clip.

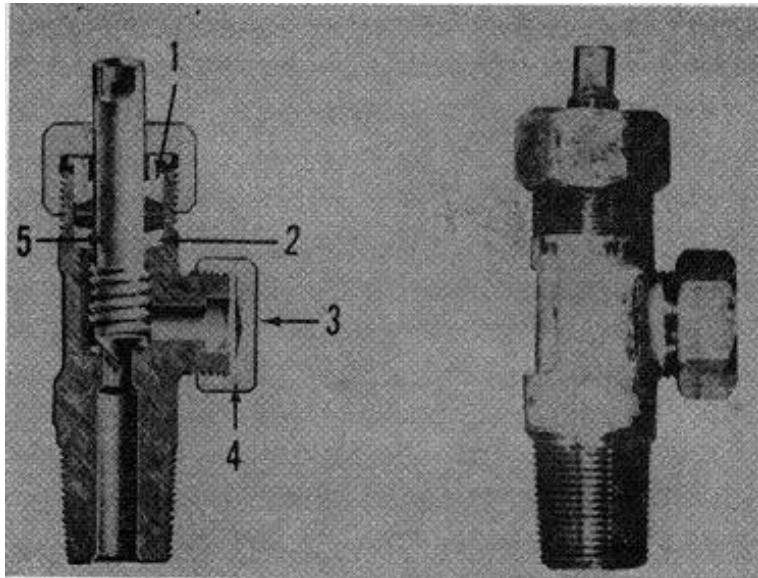
- (2) *Eduction tubes.* Two 1/2-inch inside diameter steel eduction tubes (fig. 4) extend into the container from the front head. Either eduction tube can be used for emptying or venting the container.
- (3) *Valves.* A 3/4-inch Chlorine Institute valve (fig. 5) is screwed into each eduction tube outlet. A cap (3) fitted with a gasket (4) covers the valve outlet when the valve is not in use.
- (4) *Valve-opening wrench.* A valve-opening wrench (1, fig. 2) is used to open and close the valves. It is attached to one of the valves when the container is being transported or stored.
- (5) *Rear head.* The rear head of the type A 1-ton container is of the same construction as the front head, but the rear head has no eduction tube outlets and no shipping bonnet or bonnet clips.
- (6) *Identification.* The front rim of the container is marked with the nomenclature of the container, the water capacity in pounds, the drawing number, serial number, lot number, the symbol of the agent in the container, and the date the container was tested.

b. *Type D.* The type D 1-ton container is used to ship and store chemical agents that are either liquid or gaseous at atmospheric pressure. It is identical with the type A container except for the inside diameter of the eduction tubes and eduction tube outlets as described below.

- (1) *Eduction tubes.* The inside diameter of the eduction tubes in the type D container is 1 inch.
- (2) *Valves.* One-inch Chlorine Institute valves (fig. 5) or one-inch angle valves (fig. 6) are screwed into the eduction tube outlets. Angle valves are used only in containers under low internal pressure. Chlorine Institute valves are used in containers under high pressure.

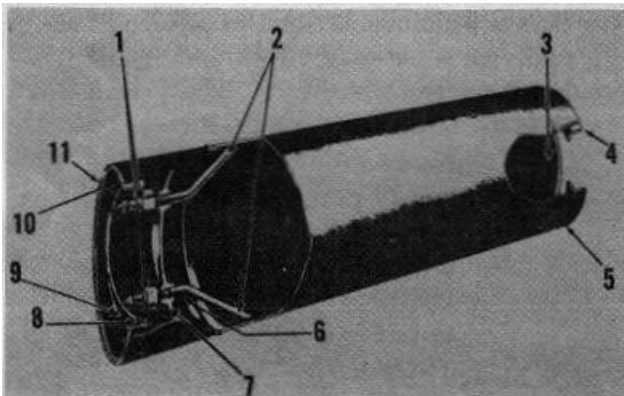
c. *Type E.* The type E 1-ton container (fig. 7) is a substitute for types A and D and can be filled with any type of liquid or gaseous chemical agent. It is approximately the same size as the types A and D and has the same capacity. It weighs 900 pounds empty compared with the 1,600-pound empty weight of types A and D. The type E container is a closed cylinder, 30 inches in diameter, made of 9/32-inch steel. Protective housings (11 and 5) welded to the front and rear ends of the container project beyond the front and rear heads. The overall length of the type E container is 82 1/2 inches.

- (1) *Front head.* The front head is a convex dome welded to the front end of the container. Two eduction tube outlets (6), 14 inches apart, are located in the front head. Each outlet is threaded to receive a 1-inch valve (1). Three tapered plugs (10) are screwed into 3/4-inch holes spaced equally around the outer edge of the front head. The plugs will blow out when the internal pressure becomes too high. Fusible plugs are installed when the container is filled with chlorine; nonfusible plugs are installed when it is filled with other chemical agents. A circular protective cover (9), bolted to the front protective housing by



- |   |              |    |               |
|---|--------------|----|---------------|
| 1 | Packing nut  | 6  | Disk          |
| 2 | Packing ring | 7  | Cap           |
| 3 | Bonnet       | 8  | Gasket        |
| 4 | Union nut    | 9  | Stem          |
| 5 | Pin          | 10 | Packing gland |

**Figure 6. Angle valve for type D or type E 1-ton containers.**



- |    |                          |
|----|--------------------------|
| 1  | Valves                   |
| 2  | Eduction tubes           |
| 3  | Rear head                |
| 4  | Steel angle              |
| 5  | Rear protective housing  |
| 6  | Eduction tube outlet     |
| 7  | Front head               |
| 8  | Cover bolt               |
| 9  | Protective cover         |
| 10 | Plug                     |
| 11 | Front protective housing |

**Figure 7. Type E 1-ton container.**

- sixteen 3/8-inch bolts, protects the front head during shipment.
- (2) *Eduction tubes.* Two 1-inch inside-diameter steel eduction tubes (2) extend into the container from the front head.
  - (3) *Valves.* One-inch Chlorine Institute valves (fig. 5) or one-inch angle valves (fig. 6) are screwed into the eduction tube outlets. Angle valves are used only in containers under low internal pressure. Chlorine Institute valves are used in containers under high pressure.
  - (4) *Valve-opening wrench.* A valve-opening wrench is furnished with the type E container.
  - (5) *Rear head.* The rear head is identical with the front head except that it has no eduction tube outlets. It is protected by the rear protective housing which protrudes approximately 1 inch beyond the rear head. A steel angle (4, fig. 7), welded around the inside of the rear protective housing, adds support to the rear head.

tested, and an inspector's stamp are marked on the front rim and on a nameplate fastened to the center of the rear head.

(6) *Identification.* The nomenclature of the container, the water capacity in pounds, the serial number, the date the container was

d. Tabulated Data.

Use	Type of container		
	A	D	E
	Agents that are gaseous at atmospheric pressure.	Any liquid or gaseous chemical agent	Substitute for type A or type D.
Weight (empty) .....	1,600 lb.....	1,600 lb	900 lb
Cubage .....	42.7 cu. ft.....	42.7 cu. Ft.....	42.7 cu. ft.
Capacity.....	170 gal.....	170 gal.....	170 gal.
Valve type.....	3/4 -inch Chlorine Institute valve.	1-inch Chlorine Institute valve for high pressure; 1- inch angle valve for low pressure.	
Overall length .....	81 1/2 in.....	81 1/2 in.....	82 1/2 in.
Outside diameter.....	30 1/2in.....	30 1/2 in.....	30 in.
Agents stored*			
With 3/4-inch Chlorine Institute valve.	AC 1,000 lb..... CG 1,600 lb..... CK 1,600 lb..... CL 1,600 lb.....	Not used.....	Not used.
With 1-inch Chlorine Institute valve	Not used.....	AC 1,000 lb..... CG 1,600 lb..... CK 1,600 lb..... CL 1,600 lb..... GA 1,600 lb.....	
With 1-inch angle valve ....	Not used.....	GB 1,600 lb. H 1,800 lb. HD 1,800 lb. HN1 1,800 lb HT 1,800 lb. VX 1,500 lb	

\*Weights shown are maximum net contents.

**5. Service upon Receipt of Material.** a.

*General.* One-ton containers usually will be transported in a truck or trailer. In use, a container may remain on the truck or trailer, or it may be removed to a stand.

b. *Inspection.* Inspect the container for leaks. Protect personnel from leaking chemical agent and decontaminate (TM 3-220) if necessary. Inspect for bulging heads or other evidence of excessive internal pressure. Measure the internal pressure with a pressure gage. Vent the container if necessary (TM 3-250).

**6. Controls.** A valve is screwed into each education tube outlet. The valves are opened by turning the valve stem counterclockwise with the valve-opening wrench; turning the valve stem clockwise closes the valves.

**7. Operation.** The 1-ton containers are always used with auxiliary equipment Instructions for using the containers with the auxiliary equipment are given in separate publications on the M1 line filling adapter (TM 3-4730-200-15 in process), the M3 airplane smoke tank filling line (TM 3-1040-208-15), and the M2 land mine field-filling apparatus (TM 3-1040-222-15).

a. Place the container on a stand that is higher than the receptacle being filled. The vehicle on which the container was transported or an improvised stand can be used for this purpose. A stand used for holding a filled 1-ton container must be capable of supporting 2 tons. Information on field improvisations can be found in TM 3-250.

b. Remove the shipping bonnet from types A or D containers or the protective cover from type E.

c. Roll the container until the valves are aligned vertically and chock it to prevent further rolling. When the valves are aligned one above the other, the end of the education tube leading to the upper valve is out of the liquid in the container and is used for venting. The end of the other education tube is in the liquid, and the contents can be withdrawn through the lower valve.

d. Be sure both valves are closed; then remove the cap from each valve outlet.

e. Connect a pressure gage to the topmost valve and measure the pressure in the container. If necessary, vent the container (*i* below) before beginning to transfer the contents.

f. Attach the auxiliary equipment to the container and proceed with filling operations.

g. Close the valves on the 1-ton container after filling operations have been completed and remove the auxiliary equipment. Do not leave either valve open on an empty container.

**Note.** If neither of the valves or education tubes can be used, empty the container by unscrewing one of the plugs and screwing the M1 line filling adapter into the plug opening.

h. Decontaminate the 1-ton container and all tools and auxiliary equipment after use (TM 3-220).

i. Vent the 1-ton container when necessary (TM 3-250) to reduce internal pressure or to relieve a vacuum formed by withdrawing part of the filling of the container. To vent the container, use the venting assembly from the M1 line filling adapter or the proper fittings from the M2 land mine field-filling apparatus.

j. After using the 1-ton container, attach the valve-opening wrench to one of the valves with a length of wire so that the wrench will remain with the container.

**8. Maintenance Instructions.** a. *Lubrication and Painting.*

(1) *Lubrication.* Lubricate the valves with engine oil (OE) monthly and before and after each use.

(2) *Painting.* In the zone of the interior, paint the container with heat proof aluminum paint if necessary. In communications and combat zones, paint with olive-drab enamel. Do not paint the valves. Instructions for preparing equipment for painting and descriptions of materials to be used are given in TM 9-213.

b. *Freeing Clogged Valves or Education Tubes.* Open clogged valves or education tubes by using the M1 line filling adapter.

c. *Removing and Replacing Valves.* Use an M1 valve replacement mechanism (TM 3-4940200-15, in process) to replace Chlorine Institute valves in a filled type A or type D container when the pressure in the container exceeds 50 pounds per square inch. The valve replacement mechanism can also be used on the type A or type D container when the pressure is lower than 50 pounds per square inch. Use the M2 valve removing wrench (TB CML 112, in process) to remove or replace Chlorine Institute valves in the type E container or in the type A or type D container when the valve replacement mechanism is not available or cannot be used. Use the M1 valve-removing wrench to replace angle valves on type D or type E containers. Apply antiseize compound to the threads on the valves before screwing them into the container.

d. *Preventive Maintenance Services.*

(1) *Inspection.* Inspect valves, safety plugs, and all connections for leakage before, during, and after operation. Inspect stored containers periodically for leakage.

(2) *Decontamination.* See TM 3-220 for detailed instructions in decontamination.

(a) *Partly filled container.* Decontaminate the exterior of the container paying special attention to exposed parts of the valves, and clean thoroughly.

(b) *Empty container.* Remove, disassemble, decontaminate, and reassemble the valves. Decontaminate the inside and outside of the container. Be sure that the decontaminating material flows through the education tubes. Rinse away all decontaminating material. Dry the interior by forcing warmed dry air through the container. Replace and close the valves.

**9. Shipment and Limited Storage.** *a. Shipment.*

One-ton containers are shipped uncrated. They may be transported in a truck, a trailer, or by rail. See TM 3-250 for instructions in shipping chemical agents.

*b. Storage.*

(1) *Empty containers.* Store empty containers with both valves closed and with protective bonnets or protective covers in place.

(2) *Filled containers.* Store filled containers out of the sun in a cool, ventilated place. Vent filled containers as required (TM 3-250). Inspect periodically for leakage.

**10. Demolition to Prevent Enemy Use.** Filled containers of toxic agents will be destroyed only on order of the commanding officer. Destroy filled containers only by explosives. Destroy empty containers either by explosives or mechanical means.

*a. Explosives.* Detonate a 3-pound explosive charge against the side of the container. The charge may be placed in a shallow hole and the container rolled on top of it, or the charge may be tamped in place.

*b. Mechanical Means.* Destroy valves and threads by battering them with a sledge hammer or other heavy implement.

## Appendix

### REFERENCES

TM 3-220	Chemical, Biological, and Radiological (CBR) Decontamination.
TM 3-250	Storage, Shipment, and Handling of Chemical Agents and Hazardous Chemicals.
TM 3-304	Protective Clothing and Accessories.
TM 3-1040-208-25P	Organizational, Field, and Depot Maintenance Repair Parts and Special Tools List for Filling Line, Metal, Airplane Smoke Tank, M3.
TM 3-1040-222-15 (when published)	Operator, Organizational, Field, and Depot Maintenance Manual-Apparatus Filling, Field, Land-Mine, M2.,
TM 3-4730-200-15 (when published)	Operator, Organizational, Field and Depot Maintenance Manual-Adapter, Line Filling, One-Ton Container, M1 (in process).
TM 3-4940-200-15 (when published)	Operator, Organizational, Field, and Depot Maintenance Manual-Mechanism, - Valve Replacement, M1 (in process).
TB CML 112	Wrenches, Valve Removing, M1 and M2 (in process).

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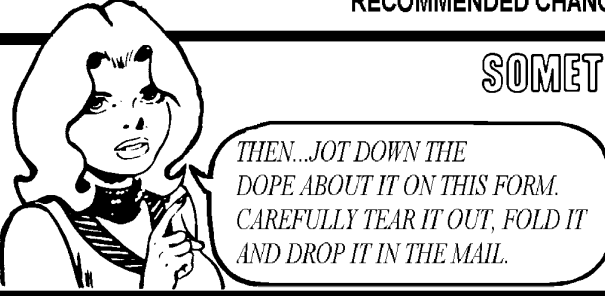
NG: State AG (3) Div (1).

USAR: None.

For explanation of abbreviations used, see AR 320-50.



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## The Metric System and Equivalents

### *Linear Measure*

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### *Weights*

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### *Liquid Measure*

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### *Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### *Cubic Measure*

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

## Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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