BY ORDER OF THE COMMANDER
59TH MEDICAL WING

59TH MEDICAL WING INSTRUCTION
41-203

9 MARCH 2018
Certified Current on, 2 March 2020
Health Services

CYLINDER-GASES (COMPRESSED AND LIQUEFIED)

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

ACCESSIBILITY: Publications and forms are available for downloading or ordering on the e-Publishing website at **www.e-publishing.af.mil**.

RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 59 MLRS/SGSMS

Certified by: 59 MLRS/CC
(Lt Col Patrick Misnick)

Supersedes: 59MDWI 41-203, 2 April, 2014

Pages: 11

This instruction implements Air Force Policy Directive 41-2, *Medical Support.* This instruction establishes procedures for the safe storage, security, transportation, identification, use, receipt, and maintenance of compressed and liquefied gas containers. This instruction applies to all personnel assigned or attached to the 59th Medical Wing (MDW) except for the 359th Medical Group and the 959th Medical Group. This instruction does not apply to the Air National Guard or Air Force Reserve. Refer recommended changes and questions about this publication to the Office of Primary Responsibility using the AF Form 847, *Recommendation for Change of Publication.* The authority to waive requirements is the publication approval authority. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include: changed process for requesting cylinders from medical materiel.

1. General Responsibilities. The officer in charge or noncommissioned officer in charge (NCOIC) of each section concerned will ensure that procedures to be accomplished by medical personnel are performed as outlined by this instruction. All personnel using compressed gas cylinders in their duties, actions such as receipt directly from a commercial contractor and gas

cylinders received by users from Medical Materiel (SGSKS) should be thoroughly familiar with the contents of this instruction and the applicable portions of the references in Attachment 1. The following procedures must be accomplished to properly receive full cylinders, accept delivery of liquid nitrogen, oxygen, or other gases, and turn over empty or repairable cylinders to a contractor for filling or repair. Medical wing sections currently using direct contract delivery, and authorized to perform these functions, are Medical Materiel, Air Force Post Graduate Dental School, Dunn Dental Clinic, Clinical Investigation, Bulverde Clinic, Camp Bullis Medical Station, and Military Working Dogs (Lackland and Medina Annex). Discrepancies or questions concerning these procedures will be directed to Medical Materiel Flight (292-6590) or the Contract Services Element (292-3088), as applicable.

2. Medical Materiel Responsibilities.

2.1. A representative from the Medical Materiel Flight must be present to validate receipt and pick up of all medical cylinders, liquid oxygen, or nitrogen deliveries from a contractor.

2.2. Delivery tickets are to be used as the receiving report source documents.

2.3. Medical cylinders and liquid nitrogen will be inspected IAW technical order (T.O.) 42B5-1-2, *Gas Cylinders (Storage Type) – Use, Handling, and Maintenance* and counted by type of gas and size of cylinder. For direct contract delivery accounts, all personnel should verify a signed delivery slip and forward to Logistics; one copy is retained. If incorrect, do not sign. Notify the NCOIC of the medical logistics warehouse or the warehouse supervisor immediately.

2.4. Liquid Oxygen (LOX) will be accounted for by square cubic feet (SCF). SCF delivered can be determined by recording the tank gauges prior to and after LOX pumping is complete. Before the LOX is pumped into the LOX tanks, medical materiel personnel will check it with an oxygen analyzer for oxygen percentage. If incorrect, contact the NCOIC of the medical logistics warehouse or the warehouse supervisor immediately.

2.4.1. A reading of 99% purity by volume or higher is required. If incorrect, contact the NCOIC of the medical logistics warehouse or the warehouse supervisor immediately. Ensure that two documents are received with the LOX delivery: a delivery slip and a Certificate of Purity.

2.5. All cylinders will be inspected by a Medical Materiel Flight representative at the time of delivery.

2.5.1. All cylinders with threaded necks will have protective safety caps installed when in storage or during transportation.

2.5.2. All cylinders have a 59 MDW Form 2980, *Cylinder Gas Tag*, or company tag, which reads "FULL," "IN-USE," and "EMPTY." **Note:** This tag is supplied by Medical Materiel. It is the responsibility of the Medical Materiel Flight to ensure that tags are on the cylinders upon delivery or receipt from Medical Materiel. It is the section's responsibility to insure the tags remain on the cylinders while in use until exchanged.

2.5.3. All oxygen cylinders require an additional tag, DD Form 1191, *Warning Tag for Medical Oxygen Equipment*. **Note:** This tag is placed on all cylinders when they leave the medical gas storage area. It is the responsibility of all personnel using oxygen cylinders to ensure that the tags are on the cylinders when being used.

2.5.4. All cylinders are properly labeled towards the top with a legible identification label that is at least 180 degrees. Also the cylinders are stenciled IAW T.O. 42B5-1-2.

2.5.5. Ensure that there is no grease or oil on the valve or cylinder body. **Note:** Oxygen is highly explosive when in contact with grease or oil.

2.5.6. Ensure the five-year hydrostatic test date (stamped into metal around collar) has not been exceeded. If the hydrostatic test date has expired, the cylinder must be turned in to the Medical Gas company for inspection/replacement.

2.5.7. Ensure all valves are tightly closed.

2.5.8. Ensure separate storage rooms are available for non-flammable and flammable gases that support combustion. Ensure also empty and full cylinders are stored separately. All storage areas must be approved by safety and the fire marshal.

2.5.9. Coordinate with bioenvironmental engineering (MRPB) to insure storage locations meet adequate ventilation standards.

3. Requesting Cylinders from Medical Materiel.

3.1. Routine Orders: All using activities will obtain medical gas cylinders by completing the Medical Gas Order Form and e-mailing it to the 59 MLRS Logistics Customer Service mailbox address (**usaf.jbsa.59-mdw.mbx.59-mlrs-customer-service@mail.mil**) for delivery of required cylinders and pick-up of empty cylinders. Normal duty hours for Medical Materiel is between 0730-1630, Monday through Friday, excluding holidays. Once the order is received by Medical Materiel, if it is in stock it can be delivered the same day. If the Medical Material warehouse does not have that particular cylinder in stock, it will be placed on order through the vendor. If the order is placed before 1400 hours, it is normally delivered to Medical Materiel the next duty day, otherwise it will be delivered on the second duty day after the order was placed with the vendor. **Warning**: Custodians exchanging cylinders at the warehouse must use carts specifically designed for cylinder transportation for movement of the empty and full cylinders. The account supply custodians can order their own cylinder carts or they can contact the Medical Materiel warehouse to borrow a cylinder cart.

3.2. Emergency Requests After Normal Duty Hours: The Medical Control Center will be contacted for emergency requests on weekends, holidays, and after 1630, Monday through Friday. They will contact the medical logistics' on-call person. **Note**: Custodians needing cylinders should check with other sections within the clinic for cylinders that are not in use, before calling out the medical materiel on-call person.

3.3. Gas cylinders.

3.3.1. Medical logistics is not required to obtain a certificate of analysis prior to accepting the delivery of medical gases in cylinder form.

3.3.1.1. The vendor is required to maintain all documentation certifying the purity of the compressed gas being supplied to the organization, not the end user.

4. Cylinder User Procedures.

4.1. Personnel using compressed gases in their work area will always check the contents of a cylinder for odor and type of gas before use. For breathing oxygen, a sniff test or an actual

smell of gas will be performed to check for odors. A check will always be made of the name of the gas stenciled on the cylinder or on the label that is affixed to it.

4.2. Pressure of the cylinder contents for gases shipped in a liquid state should always be checked by using personnel when first beginning to use a newly issued cylinder to determine whether or not a cylinder is fully charged. A low pressure is an indication, in most instances, of a defective valve; therefore, cylinders received with low pressure should be returned to medical materiel for repair. Cylinders found to be over pressurized, greater than required pounds per square inch (PSI), should be removed from the area and returned to medical materiel. After a cylinder has been used or is discontinued, the pressure reading on the regulator or gauge should be recorded on a piece of tape and affixed to the cylinder so the residual pressure can be recorded in medical materiel. If in using the gas it appears the inside of the cylinder contains foreign or loose materiel, the cylinder shall be removed from use, tagged with an explanation and turned in to Medical Materiel Flight.

4.3. Ensure appropriate tags are on all cylinders when received and use caution when handling to keep tags from falling off.

4.4. Cylinders placed in use will have the "FULL" portion of the "FULL", "IN-USE", "EMPTY" tag removed.

4.5. When a cylinder is considered empty, the "IN-USE" portion of the tag will be removed leaving the “EMPTY’ portion. If there is no tag, then a piece of tape with the word “EMPTY” will suffice.

4.6. To avoid excessive waste of breathing oxygen, cylinders should be used in the section until the regulated pressure drops to a point below 200 PSI. **Note*:*** Never allow gas to drop below atmospheric pressure. Positive cylinder pressure is required to preclude moisture or foreign matter from accumulating in the cylinder. Positive pressure is easily determined by "cracking" the valve and noting whether or not any oxygen is emitted, and simultaneously making a sniff test for contaminating odor. **Warning**: Under no conditions will breathing oxygen cylinders be re-pressurized by using activities.

4.7. Cylinders will be further inspected for oil and grease. Cylinders found with oil or grease should be immediately turned in to Medical Materiel Flight with an explanation provided.

4.8. Gas cylinders that have had the pressure released below atmospheric pressure must be returned to be cleaned and dried. These cylinders must be immediately returned to the Medical Materiel Flight with an explanation provided.

4.9. Cylinders must be secured in place with a chain or a cargo strap against a wall. Cylinders may also be secured upright or on its side secured in a rack or cage. All cylinders that are not in use must have cylinder caps installed (except for cylinders without threads). All empty cylinders are required to have the regulators removed and caps installed prior to storage or transportation.

4.10. Always transport cylinders using equipment designed to handle cylinders. Do not use improvised handling devices.

5. Safety Rules.

5.1. Cylinder contents should always be referred to by their proper names rather than "AIR" or "GAS".

5.2. Do not tamper with safety devices in valves or cylinders.

5.3. Use of regulators, gauges, hoses, and other fittings:

5.3.1. Non-sparking wrenches are required for the installation or removal of regulators on gas cylinders. These wrenches may be ordered through Medical Materiel Flight. **Caution:** Do not use regulators, pressure gauges, hoses and other fittings for oxygen when they have been used for oil-pumped or combustible gases. Equipment for breathing oxygen will be restricted to that use. Regulators, pressure gauges, hoses, and other fittings will not be used interchangeably with similar equipment used with other gases.

5.3.2. Particular care must be exercised in checking that threads on regulators or unions are the same as those on the valve being used. If fittings are hard to turn, they must not be forced but checked to be certain they are of the correct thread and type, and are not damaged. Threads must be of the same type and number of threads per inch to be engaged and produce a satisfactory seal.

5.3.3. Compressed gas from any cylinder shall not be used without reducing the pressure through a regulator or throttle valve intended for this purpose. Reduction in pressure shall not be accomplished by throttling through the cylinder valve. **Note*:*** An exception to the above rule is the transfer of other gases in a liquid state at normal temperatures. **Warning**: Other types of gases: Cylinder valves shall not be opened (cracked) near welding work, sparks, flame, or any other possible source of ignition, or in a closed room. Other cylinders: Before connecting the coupling of pressure regulator to the cylinder valve, the valve shall be "cracked" or turned approximately a 1/4 turn and closed immediately. This clears the valve of dust, dirt, or moisture elements which would otherwise enter the regulator. Stand to side when doing this.

5.3.4. After attaching the regulator to the cylinder valve ensure the adjusting screw in the regulator is released before opening the cylinder valve.

5.3.5. If difficulty is experienced in opening a valve, the valve opening will be pointed away from the operator and other personnel, and greater force used to open the valve. Valves fitted with hand wheels should be operated by hand only; those designed to use a wrench should be operated only with a properly fitted wrench or key provided for this operation. If a wrench or key is used, it must be kept ready for instant use while gas is being used from that cylinder. **Note:** Wrenches or hammers must <u>never</u> be used to open or close cylinder valves equipped with hand wheels. The use of such tools on this type of valve will damage the valve seat material, resulting in escape of gas, particularly at high pressure. Enough pressure can be exerted with a person's hand to close the valve without the use of a wrench, hammer or pliers. If the valve cannot be totally closed by hand, the gas will be permitted to escape to the immediate environment and the valve will be inspected and repaired as found necessary. In this instance, the cylinder (if located in a using activity) will be immediately returned to Medical Materiel Flight or contact the Gases Contract Representative for Pick up with an explanation for the return. If the cylinder is located in Medical Materiel Flight, it will be tagged with a DD Form 1577-2,

Unserviceable (Repairable) Tag Materiel and the form will be annotated "INSPECT OR REPAIR LEAKING VALVE".

5.3.6. Cylinder valves must be opened slowly to prevent sudden discharge of gas into the regulator.

5.3.7. Before a regulator is removed from a cylinder, the cylinder valve will be closed and all gas released from the regulator.

5.3.8. Fully, but slowly, open cylinder valve each time gas is used from a cylinder. **Caution**: Acetylene valves are an exception to the above rule. Acetylene valves will never be opened more than 1 1/2 turns. Usually a 1/2 turn or less is sufficient for welding purposes.

5.3.9. If a valve leak is discovered when it is opened; the valve must be closed immediately. If the leak does not stop by closing the valve, the cylinder will be transported out of the building in order to release the remaining gas into the atmosphere. The cylinder will then be tagged as repairable using DD Form 1577-2. During this period, all unnecessary personnel and sources of ignition will be kept away from the cylinder. In the event a leak develops in the safety device, the cylinder will be transported outside and the valve opened to allow off gassing.

5.3.10. Never attempt to stop a leak between the cylinder and its regulator by tightening the adjustment nut unless the cylinder valve has been closed first and enough time has lapsed for full off gassing to occur.

5.3.11. Valves will always be kept closed when not in use and valve protection caps will be replaced. Extreme care will be taken not to damage outlet threads. Oxygen cylinders are equipped with "dust caps" for outlet valves. These "dust caps" will be in place at all times except when the cylinder is in use.

5.4. Stamped numbers or markings on cylinders will not be altered or defaced.

5.5. Compressed gas cylinders will be considered full and handled with corresponding care at all times to prevent possible accidents. Do not drop or allow to forcefully strike each other or any other object. Cylinders will stand upright during use or storage and will be fastened or secured in place with a chain or a cargo strap against a wall to prevent being accidentally upset. Particular care will be taken by personnel not to bump or strike the cylinder valve or head assembly. Cylinders will not be used where they can be damaged by passing or falling objects.

5.6. Cylinders will not be lifted by grasping the valve or the valve protection cap. Cylinders will not be handled by twisting the valve protection cap or valve and rolling the cylinder.

5.7. Compressed gas cylinders must not be lifted by cranes or mechanical lifts unless fastened in special containers, racks, or cradles. Rope or chain slings should not be used to lift gas cylinders.

5.8. Suitable trucks with provisions for holding cylinders securely in position should be used for conveying, transporting or handling cylinders at all times. Cylinders will never be handled otherwise without first removing regulators, flow meters, and other manifolding accessories and replacing the valve outlet cap or cylinder valve protection cap when available.

5.9. Cylinders will never be used as rollers, supports, or for any purpose other than the transportation and delivery of compressed gases, even though they are empty.

5.10. Compressed gas will never be used to dust off clothing, as serious injury to the eyes or body may result.

5.11. Flames, sparks (including static sparks), or ignition from any source must not come into contact with hose, tubing or cylinders. Cylinders will not be used near stoves, radiators, furnaces, heated floors or other hot places when temperatures are in excess of 125° degrees Fahrenheit (51.7° degrees Celsius) or operations where heat, slag or hot metal may be contacted. Non-sparking wrenches must always be used when making cylinder connections.

5.12. Pry bars must never be used under valves or valve caps to pry cylinders loose when frozen or fixed to the ground or floor.

5.13. Ensure all safety devices and precautions are utilized when handling or using any gas cylinder, as damage to the valve could cause rapid, unimpaired escape of compressed gas from the cylinder which could result in serious property damage, personnel injury or loss of life.

5.14. Ensure all personnel use and enforce all safety measures at all times.

SCOTT C. SUCKOW, Colonel, USAF, MSC
Administrator, 59th Medical Wing

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 41-2, *Medical Support*, 28 June 2013

AFI 23-111, *Management of Government Property in the Possession of the Air Force*, 29 October 2013

AFI 41-209, *Medical Logistics Support*, 6 October 2014

T.O. 42B5-1-2, *Gas Cylinders (Storage Type) – Use, Handling, and Maintenance*, 16 August 2010

Prescribed Form

59 MDW Form 2980, *Cylinder Gas Tag*

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*

DD Form 1191, *Warning Tag for Medical Oxygen Equipment*

DD Form 1577-2, *Unserviceable (Repairable) Tag Materiel*

Abbreviations and Acronyms

IAW—In Accordance With

LOX—Liquid Oxygen

MDW—Medical Wing

NCOIC—Noncommissioned Officer in Charge

PSI—Pounds Per Square Inch

SCF—Square Cubic Feet

T.O—Technical Order

Attachment 2

ASSESSMENT TOOL FOR CONUS/OCONUS FACILITIES

Figure A2.1. Assessment Tool for CONUS/OCONUS Facilities.

ALL PURPOSE CHECKLIST	PAGE 1 OF 2 PAGES
TITLE/SUBJECT/ACTIVITY/FUNCTIONAL AREA Assessment Tool for CONUS/OCONUS Facilities	OPR DATE

NO.	ITEM *(Assign a paragraph number to each item. Draw a horizontal line between each major paragraph.)*	met/ yes	not met/no	N/A
	Does your facility stock portable compressed medical gases. If yes, answer the following questions:	☐	☐	☐
	Does your facility stock portable compressed CO2	☐	☐	☐
	If yes, when was the last time compressed CO2 was used in your facility	☐	☐	☐
	If yes, what does your facility use CO2 for Med gases are segregated by gas type and fill status	☐	☐	☐
	Who controls access to MTFs compressed medical gas tanks	☐	☐	☐
	Is access to medical gas storage area limited to authorized personnel only	☐	☐	☐
	Bedded MTFs: Who controls compressed medical (tanks) gases in Critical Care areas (e.g: ED, ICU, L&D, OR's)	☐	☐	☐
	Who controls access to compressed medical gases in the using department area once dispensed by Medical Logistics	☐	☐	☐
	360 degree labeling is present on all med gas cylinders	☐	☐	☐
	A local policy (e.g.: Operating Instruction) has been written/approved/maintained to address the safe handling and proper management of med gases	☐	☐	☐
	What is the date of your current policy	☐	☐	☐
	Permanently installed/piped medical gas (where applicable) is the primary source of med gas distribution used within the MTF with portable gas cylinders used for transport/back up	☐	☐	☐
	All staff are trained to identify med gas cylinders by label type, not relying on shape/size/color of the medical gas cylinder alone	☐	☐	☐
	Acquisition personnel ensure all purchased medical gas cylinders meet cylinder safety and content purity standards set-forth by US Pharmacopeia (USP) for each respective med gas	☐	☐	☐
	A standard template has been designed for each MTF OR/C-Section suite set-up that delineates the location, storage and handling of med gases within these suites	☐	☐	☐
	In-service med gas training is conducted/documented at least annually for applicable clinical, logistics, and facilities personnel and at MTF New Comer's Training for all newly assigned personnel prior to beginning patient care activities	☐	☐	☐
	Green/colored "Christmas Tree" adaptors are no longer allowed to be used in the MTF	☐	☐	☐
	Pin Indexed (Gas specific) regulators and flow meters are used on all med gas cylinders and wall unit delivery devices	☐	☐	☐
	All patient medical gas delivery device connections are visible and labeling/placards are prominent and visible from all angles/lighting conditions	☐	☐	☐
	Medical Logistics/Facility Management personnel inspect medical gas storage locations at least annually	☐	☐	☐
	Permanently Installed/Piped med gas systems that have been abandoned-in-place are clearly marked as being "disabled" and rendered un-usable	☐	☐	☐
	Acquisition personnel ensure exact gas type is specified for each order/contract, i.e., oxygen USP, nitrogen NF, nitrous oxide USP…in accordance with FDA/USP standards	☐	☐	☐
	Vendor maintains USP/FDA purity documentation/certification	☐	☐	☐
	An annual med gas inventory has been completed	☐	☐	☐
	All med gases no longer required in the facility have been removed and disposed of in accordance with applicable guidance/directives	☐	☐	☐
	During transport, all medical gas cylinders are secured	☐	☐	☐
	When not in-use, all medical gas cylinders are returned to the units designated medical gas storage location	☐	☐	☐
	All personnel that dispense/receive compressed medical gas employ the point of issue checklist	☐	☐	☐
	Medical gas storage area has proper lighting, labeling, storage, access, and security	☐	☐	☐
	How are the tanks labeled (marked/identified)	☐	☐	☐
	Med gases are segregated by gas type and fill status	☐	☐	☐
	How many medical gas tanks are stored at your facility	☐	☐	☐
		☐	☐	☐

AF IMT 2519, 19911101, V5 PREVIOUS EDITIONS ARE OBSOLETE.

PAGE 2 OF 2 PAGES

NO.	ITEM *(Assign a paragraph number to each item. Draw a horizontal line between each major paragraph.)*			
	Comments:	☐	☐	☐

AF IMT 2519, 19911101, V5 *(REVERSE)*