c m c container management company

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Closing Drums & Other Containers Properly – US DOT Guidance:

United States Department of Transportation regulations state that packaging manufacturers are required to notify each person to whom the packaging is transferred of all requirements not met at the time of transfer. This requirement is given in Title 49, Code of Federal Regulations (49 CFR), Part 178 Specifications for Packagings, § 178.2 (c). In addition this Paragraph requires the closing information to be provided to any person to whom this package is transferred who may need to close the packaging prior to re-shipment. Furthermore, it is the shipper's responsibility as set forth in §173.22(a)(4) to ensure that these closing instructions are carried out as described. In order to ensure the instructions are followed in a manner to result in safe transport of hazardous materials the shipper is obligated, as set forth in § 172.704(a)(4), namely - function specific training - to train his/her employees in the correct way to close the packaging for shipment. In order to fulfill this obligation the shipper often turns to the packaging manufacturer for this training since the manufacturer has designed, produced and tested the packaging to meet UN performance standards. Mauser is prepared to provide this training in addition to supplying closing instructions. It has been the practice of Mauser to send closing instructions attached to the shipping documents with each shipment of drums. Below is some specific information on closing Mauser packagings.

The following tables and text give examples of the parts and closing torque required to prepare the drum or IBC for shipment so that it is capable of meeting the performance standards indicated by the UN marking on the side of the packaging. Mauser recommends that only parts that have been tested and certified by Mauser be used to close the packagings for shipment. Each closure is supplied with the proper gasket in accordance with the UN design type tests for the packaging supplied. In the case of removable head drums the lids, gaskets and locking rings are supplied as tested. In the case of Intermediate Bulk Containers, IBC's, the lid, gaskets, plugs, cages, pallets, valves and service equipment are supplied as tested. Pictures of the plugs, lids and rings may be found on the website under products and services/ accessories. If a specific closure is not listed on the website or your specific closure is not listed below, please contact Mauser Corp for assistance.

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PRIOR TO CLOSING:

Inspect each closure to ensure that the closure has the proper gasket and that both closure and gasket are in good condition. Inspect the sealing surface for damage and make sure the threads and sealing surfaces are dry.

Plastic Drums

PLASTIC NON-REMOVABLE HEAD DRUMS

All non-removable head, **UN 1H1, Plastic Drums**, 49 CFR § 178.509(a)(1), 15 gallon to 65 gallon nominal capacity supplied with plug or screw cap closures with gaskets must be closed for shipment using only the closures and gaskets supplied and specified in the design qualification test for the drum as indicated below:

	Part Size / Part Number (Plug number with gasket)	Torque
a	2-inch buttress: L10-xx with L11-xx	20 ft.-lbs.
b	2-inch NPS: L16-xx with L12-xx	20 ft.-lbs.
c	2-inch NPS: L16RFCPP-RK faucet carrier with L12RPE-53RK	20 ft.-lbs.
d	2-inch NPS: L16R with L12EP	30 ft.-lbs.
e	2-inch ACT buttress: SA10B with A72	30 ft.-lbs. 40 ft.-lbs.
f	3/4-inch NPS: C34 with	6 ft.-lbs.
g	2-inch Tamper-Evident: L10TEG-RK with L11EP-RK	25 ft.-lbs.
h	2-inch Tamper-Evident: L16TEG-RK with L12EP-RK	25 ft.-lbs.
i	L10-HD with L11B4F-HD	25 ft.-lbs.
j	70x6 BCS LR10W with LR11EP	35 ft.-lbs.
k	70x6 BCS LR10W with LR11VT	35 ft.-lbs.
l	56x4 BCS LR17 with LR12EP	20 ft.-lbs.

Note: Mauser uses various buttress and NPS plugs under the generic part numbers L10 and L16 respectively. They are supplied with the drum with gasket-installed ready for final closing for shipment. The plug and gasket are specific to the drum as tested. Likewise the screw caps are supplied with gasket as tested. The closures must be properly installed and tightened to the torque shown or specified on the particular closing instructions for the drum supplied. Closures must be tightened to recommended torque using pre-set or variable-range machinist torque wrenches calibrated to the indicated value.

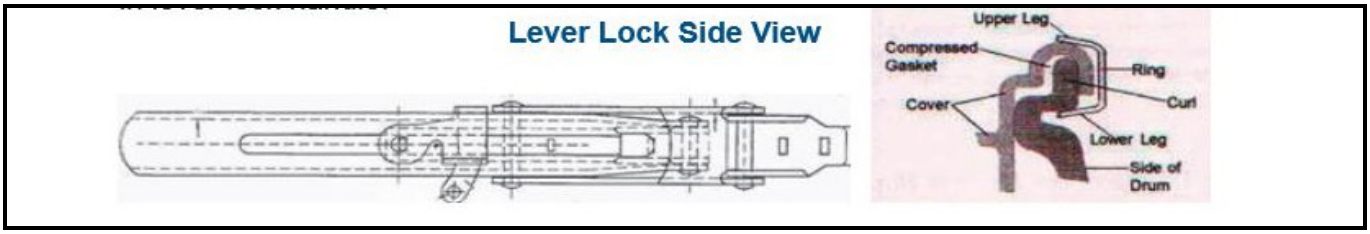
PLASTIC NON-REMOVABLE HEAD DRUMS

	Part Size / Part Number (Plug number with gasket)	Torque
a	Vanguard Lid with 2-inch Self-seal type NPS plug	9 ft.-lbs.
b	Vanguard Lid with ¾ inch Self-seal type NPS plug	5 ft.-lbs.
c	Standard lid with 2 inch NPS plug	15-20 ft.-lbs.
d	Standard lid with ¾ inch NPS plug	9 ft.-lbs.

All removable head, **UN 1H2, Plastic Drums**, 49 CFR § 178.509(a)(2), of nominal capacity 15 to 60 U.S. gallons supplied with plastic lids, gaskets and associated clamp bands, or locking rings, must be closed for shipment using only the components supplied and specified in the design qualification tests according to the following installation instructions:

a. Place drum lid with gasket and selected clamp band as supplied on the top opening of the drum body.
b. Firmly place lid onto top opening by applying downward pressure to lid above drum sidewall.
c. While pressing down on lid, engage locking mechanism of clamp band to secure the lid in place. Make sure the locking mechanism is completely latched. Insert locking tab into slots in lever lock handle.

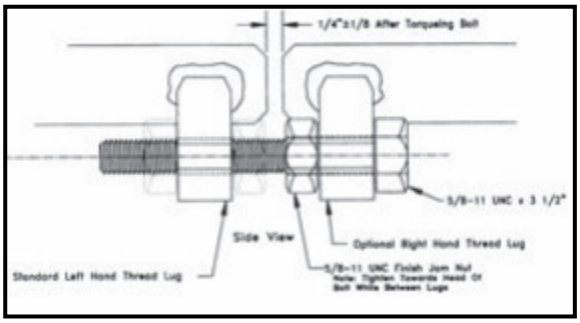
Lever Lock Side View



The Mauser removable head plastic drum may be provided with a bolt ring closing device. This bolt ring is closed as follows:

a. Place lid with gasket in place, as supplied, on the curl at the top of the drum body.
b. Place bolt ring around the drum head and curl.
c. Using a head compressor, apply force to the top of the drum head assembly to compress head gasket.
d. Drive bolt into lug until the ends of the bolt ring are at a 3/8-inch or less ring gap.
e. If a head compressor is not available, start bolt into lug, alternating tapping of ring with a mallet and drive bolt with a wrench, until bolt ring ends meet the above requirements.
f. When ring has been tightened as required, the jam nut must be tightened against the left lug.

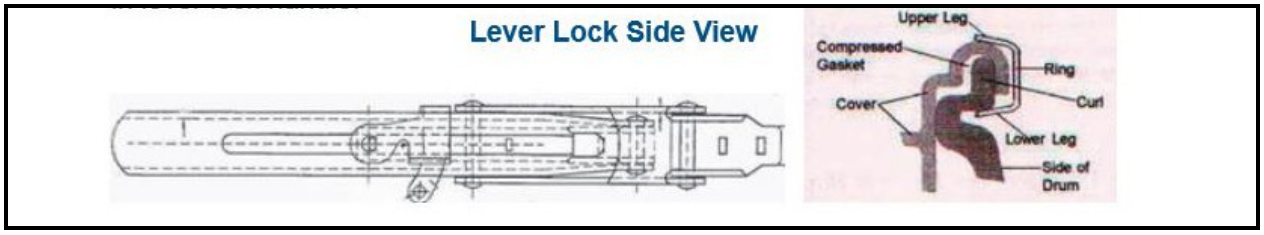
Bolt Ring Closure –Plastic Drums



PLASTIC DRUMS AND JERRICANS

All removable head, UN **1H2 55 gallon plastic** solids drums supplied with lids, gaskets and associated clamp bands or lever locking ring, must be closed for shipment using only the components supplied and specified in the design qualification tests according to the following installation instructions:

a. Place drum lid with gasket and selected clamp band as supplied on the top opening of the drum body.
b. Firmly place lid onto top opening by applying downward pressure to lid above drum side-wall.
c. While pressing down on lid, engage locking mechanism of clamp band to secure the lid in place. Make sure the locking mechanism is completely latched. Insert locking tab into slots in lever lock handle.



Steel Drums

STEEL NON-REMOVABLE HEAD DRUMS

All non-removable head, **UN 1A1, Steel Drums**, 49 CFR § 178.504(a)(1), that are supplied with plugs and gaskets must be closed for shipment using only the plugs and gaskets supplied and specified in the design qualification test for the drum, as indicated below:

a. Tri-Sure™ Plugs, 2-inch and 3/4-inch steel and plastic, installed in Tri-Sure™ steel flanges of corresponding size and tightened to the torque recommended by American Flange & Manufacturing Co., Inc. for the plug gasket used, as indicated below. Materials classified as "POISONOUS BY INHALATION" must be sealed with Tri-Sure steel, gasketed TabSeal caps.
b. Rieke® Corporation plugs 2-inch and 3/4-inch steel and plastic, installed in the appropriate Rieke steel or plastic flange of corresponding size and tightened to the torque recommended by Rieke, as indicated below:

		Gasket Type	3/4" Torque	2" Torque
a	Rieke [1]: VISE-GRIP II – Plastic Flange	Polyethylene	9 ft.-lbs.	20 ft.-lbs.
b	Rieke: VISE-GRIP II – Plastic Flange	Rubber	9 ft.-lbs.	20 ft.-lbs.
c	Rieke VISE-GRIP II- Steel Flange	Polyethylene	9 ft.-lbs.	20 ft.-lbs.
d	Rieke: VISE-GRIP II- Steel Flange	Rubber	9 ft.-lbs.	20 ft.-lbs.
e	Rieke: VISE-GRIP II Plug with built-in gasket – Plastic Flange		9 ft.-lbs.	20 ft.-lbs.
f	Rieke: VISE-GRIP II Plug with built-in gasket – Steel Flange		9 ft.-lbs.	20 ft.-lbs.
g	Rieke: Steel Plug – Steel Flange	Polyethylene	20 ft.-lbs.	40 ft.-lbs.
h	Rieke: Steel Plug – Steel Flange	Rubber	15 ft.-lbs.	30 ft.-lbs.
i	TS Type [2]: Polypropylene and Nylon plugs	Polyethylene	8 ft.-lbs.	15 ft.-lbs.
j	TS Type: Polypropylene and Nylon Plugs	Rubber	8 ft.-lbs.	15 ft.-lbs.
k	TS Type: Polyethylene Plugs (highdensity)	Rubber	8 ft.-lbs.	15 ft.-lbs.
l	TS Type: Self-Gasketing, polyethylene plug		5 ft.-lbs.	12 ft.-lbs.
m	TS Type: Steel Plugs	Polyethylene, Teflon	20 ft.-lbs.	30 ft.-lbs.
n	TS Type: Steel Plugs	Rubber	12 ft.-lbs.	20 ft.-lbs.
o	TS Type: Zinc Die-Cast Plugs	Polyethylene, Teflon	20 ft.-lbs.	30 ft.-lbs.
p	TS Type: Zinc Die-Cast Plugs	Rubber	12 ft.-lbs.	20 ft.-lbs

[1] ISO 15750-3 Circular Serrated Closure Type B. ANSI MH2-2003 § 3.1.4

[2] ISO 15750-3 Octagonal & Hexagonal Closures Type A. ANSI MH2-2003 §3.1.4

Steel Drums

STEEL REMOVABLE HEAD DRUMS[3]

All removable head, **UN 1A2, Steel Drums**, 49 CFR § 178.504(a)(2), that are supplied with clamp bands, bolts, gaskets and lids must be closed for shipment using only the components supplied and specified in the design qualification tests for the drum.

a. Place lid with gasket in place, as supplied, on the curl at the top of the drum body.
b. Place bolt ring around the drum head and curl.
c. Using a head compressor, apply force to the top of the drum head assembly to compress head gasket.
d. Drive bolt into lug until the ends of the bolt ring are as follows:
    i. For steel drum thickness (marked on bottom of drum) 1.3/1.1/1.1: 1/2-inch or less ring gap.
    ii. For steel drum thickness (marked on bottom of drum) 1.1/0.8/1.1: 3/8-inch or less ring gap.
    iii. NOTE: If prescribed ring gap cannot be achieved, torque ring to 75 +/-5 ft.-lbs. The ends of the ring should not be touching, maintain a minimum gap of 1/16".
e. If a head compressor is not available, start bolt into lug, alternating tapping of ring with a mallet and drive bolt with a wrench, until bolt ring ends meet the above requirements.
f. When ring has been tightened as required, the jam nut must be tightened against the left lug.

Removable head, **UN 1A2, Steel Drums,** that are supplied with (fittings / bungs) plugs and gaskets in the lids must be closed for shipment using only the plugs and gaskets supplied and specified in the design qualification test for the drum, as indicated below:

a. Tri-Sure™ Plugs, 2-inch and 3/4-inch steel and plastic, installed in Tri-Sure™ steel flanges of corresponding size and tightened to the torque recommended by American Flange & Manufacturing Co., Inc. for the plug gasket used, as indicated below. Materials classified as "POISONOUS BY INHALATION" must be sealed with Tri-Sure steel, gasketed TabSeal caps.
b. Rieke® Corporation plugs 2-inch and 3/4-inch steel and plastic, installed in the appropriate Rieke steel or plastic flange of corresponding size and tightened to the torque recommended by Rieke, as indicated in chart above for non-removable head drums.



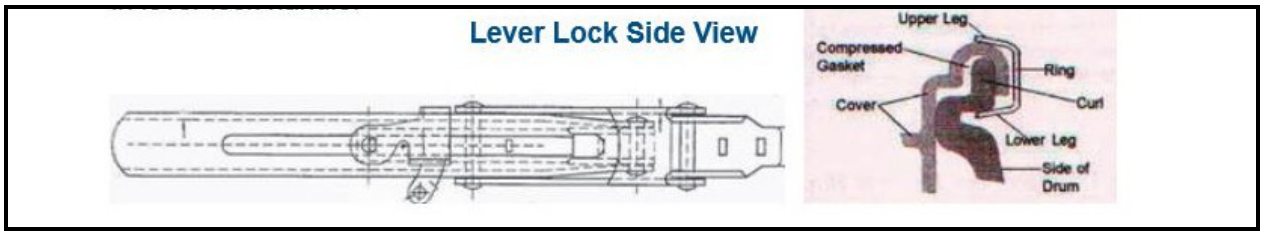
[3] ANSI MH2-2003 §3.2 and 3.2.4

CLOSURE NOTIFICATION ADVICE

Pursuant to the requirements of the U.S. Department of Transportation at 49 CFR 178.509

All removable head, **UN1A2 55 gallon steel** solids drums supplied with lids, gaskets and associated clamp bands or lever locking ring, must be closed for shipment using only the components supplied and specified in the design qualification tests according to the following installation instructions:

a. Place drum lid with gasket and selected clamp band as supplied on the top opening of the drum body.
b. Firmly place lid onto top opening by applying downward pressure to lid above drum side-wall.
c. While pressing down on lid, engage locking mechanism of clamp band to secure the lid in place. Make sure the locking mechanism is completely latched. Insert locking tab into slots in lever lock handle.



OPEN HEAD DRUM - LEVERLOCK CLOSURE

1. CHECK GASKET – to ensure cover gasket is properly fitted into cover groove (see Fig. 1 or 2).
2. PLACE COVER ON DRUM – being careful to properly seat gasket around curl (see Fig 3).
3. OPEN LEVERLOCK – and place expanded ring on to the drum cover with the vertical-skirt hugging the drum body (see Fig. 7).
4. CLOSE LEVERLOCK – by slowly and cautiously pulling the LEVERLOCK so that the outer ring engages the cover / body juncture. Downward pressure along with tapping the outside of the ring may assist in an even closure (see Fig. 8).
5. ENGAGE LOCK – to complete closure.


Figure 7 – Expanded ring being placed on drum


Figure 8 - Lever being closed slowly

Intermediate Bulk Containers (IBC)

INTERMEDIATE BULK CONTAINERS

	IBC Type	Gasket Type	Torque
a	Bulkdrum II	Natural Rubber	70 ft.-lbs.
b	Bulkdrum III	Santoprene	70 ft.-lbs.
c	SM 275/330	Natural Rubber	70 ft.-lbs.
d	SM 275/330	EPDM	70 ft.-lbs.
e	SM 275/330	Viton	70 ft.-lbs.
f	TC	Santoprene	70 ft.-lbs.
g	TC	EPDM	70 ft.-lbs.
h	2" plug in Standard lid, vented and solid	EPDM	20 ft.-lbs.

All UN 31HA1 and 31 HG1 Composite **IBC's (275G / 330G)** 49CFR § 178.707 (a) (5) that are supplied with lids, cages, pallets and service equipment must be closed for shipment using only the components supplied and specified in the design qualification tests for that IBC.

a. Place the lid with gasket in place on the top opening of the IBC.
b. Screw the lid by hand until the gasket is in contact with the sealing surface.
c. Using the lid adaptor and torque wrench tighten the lid to the recommended torque. Recommended torque is reached when the wrench releases or clicks.
d. Preset torque wrenches or adjustable torque wrenches are suitable for this procedure.

Closing Procedures for plugs and caps

The plug or cap is inserted into the appropriate opening and screwed down hand tight until the gasket is in contact with the sealing surface. A torque wrench capable of applying the proper torque to the fitting as specified by the closing instructions is then used to tighten the plug or cap until it reached the pre-set torque.

The following are photographs of various torque wrenches Mauser has found suitable to apply the required closing torque.

Top:Craftsman (Sears) 210 N-m Bottom:Performance Tool Brand 29 N-m

Rieke® Pre-set torque wrench 34 N-m

Wrenches suitable to open and re-close drums for in house use.
Cannot be used to close drums for shipment of hazardous materials.