



Closing Instructions-Steel Drums

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.

These closing instructions must be given to the individuals responsible for closing the packagings prior to shipment. A hard copy (printed) must be maintained by the filler or offeror for shipment.

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 or top 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.

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. Replace any defective gaskets, plugs or lids with new, defect free parts as sold with the original packaging.

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 following is then used to tighten the plug or cap until it reaches the pre-set torque as indicated by a release or click. These wrenches should be calibrated at least annually.

STEEL NON-REMOVABLE HEAD DRUMS

1. 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 Tab-Seal 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.
 - c. For Technocraft brand plugs and flanges please follow the guidance under "TS Type" in the following table.

	Closing Torques in ft.-lbs. (by Type)	Gasket Type	3/4" Plug Torque	2" Plug 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.

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

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 (high-density)	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.

STEEL REMOVABLE HEAD DRUMS³

- 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.
- Place lid with gasket in place, as supplied, on the curl at the top of the drum body.
- Place bolt ring around the drum head and curl.
- Using a head compressor, apply force to the top of the drum head assembly to compress head gasket.
- Drive bolt into lug until the ends of the bolt ring are as follows:
 - For steel drum thickness (marked on bottom of drum) 1.3/1.1/1.1 to 1.1/0.9/1.1: 1/2-inch or less ring gap.
 - For steel drum thickness (marked on bottom of drum) 1.1/0.8/1.1 or less: 3/8-inch or less ring gap.
 - 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".
- 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.
- When ring has been tightened as required, the jam nut must be tightened against the left lug.
- If using a 0.625" shoulder type bolt a jam nut is not required. These particular bolts claim easier ergonomics for the person closing the drums and less deformation of the ring in closing—hence better fit. Thread the bolt into the ring nut and tighten until the threaded portion is through the nut. The smooth unthreaded portion will not engage the threads and tightening stops at the prescribed gap.

COMPOSITE DRUMS

- All non-removable head, UN 6HA1, Composite drums, 49 CFR § 178.522(a)(1), 55 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	HDPE Liner 6HA1/X1.8/350 and X1.8/300: 2 inch double buttress L-10xx with L11EP-xx	29-32 ft.-lbs
b	Liner 5506: 2-inch NPS: L16-xx with L12-xx	14-18 ft.-lbs.
c	Liner 5506: ¾ inch NPS: C39-xx	4-6 ft.-lbs.
d	HDPE Liner 6HA1/Y1.8/100: 2-inch double buttress: L10-xx with L11EP-xx	21-25 ft.-lbs.
e	LDPE Liner 6HA1/Y1.8/100 and Y2.0/100: 2-inch combination plug: A16 EPG-TR	14-18 ft.-lbs.
f	LDPE Liner 6HA1/Y1.8/100 and Y2.0/100: 3/4 inch NPS: C34TR with C31EP-TR gasket	4-6 ft.-lbs.
g	Liner 5510 :2-inch double buttress: L10-HD with L11-B4F	25-30 ft.-lbs.
H	Nylon/Polypropylene 2 inch with EPDM Gasket	12-15 ft.-lbs.

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

³ ANSI MH2-2003 §3.2 and 3.2.4