Prepared By	**RBI**	**09/09/14**
Mgr Engr	**AJW**	**09/11/14**
GM QA	**GJR**	**09/08/14**
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SUBJECT: SEALLUBE APPLICATION PROCEDURE

1.0 SCOPE

1.1 This document details the requirements for the proper application of SealLube HTM 1001 (mill end) and LTF 4444 (field end) for API, Hunting, and other proprietary connections.

2.0 GENERAL

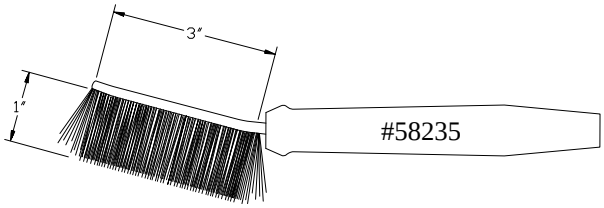
2.1 The purpose of this document is to provide instruction in the application and use of SealLube.

2.2 SealLube is not a substitute for proper running procedures and will not prevent galling, connection damage, or connection failure if improper practices are utilized.

2.3 SealLube is a thread compound to be used in lieu of API compounds. SealLube is an anaerobic sealant. Anaerobics characteristically separate when exposed to high temperatures.

2.4 SealLube is an environmentally friendly anaerobic thread compound. Properly applied, SealLube fills voids and minor imperfections in the thread form and provides a gastight seal throughout the entire thread length. SealLube is easily applied by brush and has little waste compared to API compounds.

NOTE: Hunting recommends the use of Moustache Brush #58235 for the application of SealLube.



NOTE: Due to increased surface area, for sizes larger than 3 1/2", use LTF 4444; for 3 1/2" and smaller, use HTM 1001.

SealLube LTF-4444 has make-up torque values equivalent to API torque and a break-out torque approximately 1.5 times the make-up torque. HTM-1001 has make-up torque values equivalent to API torque, and a break-out torque approximately 3.0 times the make-up torque. Torque correction factors are not required during make-up.

NOTE: Break-out torque values only apply after a 24 hour curing time. If accelerated cure time is needed see Section 2.7 of this procedure.

2.5 SealLube HTM-1001 is recommended for mill end coupling installation. HTM-1001 enhances breakout torque by approximately 3.0 times the make-up torque and prevents mill coupling turns during running and tripping of the string.

2.6 SealLube LTF-4444 is recommended for application to the field end pin and/or coupling threads during running of the string. LTF-4444 has break-out torques approximately 1.5 times the make-up torque which, when used in conjunction with HTM-1001 under the coupling allows the connection to always break-out at the field thread during tripping of the string.

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2.7 When SealLube is to be applied to 22 chrome, or other high alloy material, or fiberglass connections each connection must receive a light spray coating of Loctite Primer N before application of SealLube. This application of Loctite Primer N initiates and accelerates the curing process of SealLube.

2.8 Loctite Primer N may be used on any grade of material when accelerated cure rates are desired.

3.0 STORAGE AND SHIPPING

3.1 SealLube should not be allowed to reach temperatures over 100 degrees Fahrenheit.

3.2 To maintain shelf life, and prevent product separation, SealLube must be shipped and stored in a controlled environment.

3.3 All shipments from the manufacturer (Loctite Corporation) to Hunting central storage facility are stored in a controlled environment.

3.4 SealLube received by customers should be kept cool until ready for use.

3.5 If SealLube is briefly exposed to high temperatures and becomes separated, it may be remixed without affecting the performance characteristics. The entire tube of product should be dispensed into a clean non-metallic container and mixed thoroughly with a clean non-metallic stirrer.

Warning: **Do not use containers or tools which have been contaminated with API modified thread lubricant or other petroleum products.**

4.0 SURFACE PREPARATION AND CONDITION

4.1 All thread surfaces must be free of thread lubricant or other petroleum products prior to the application of SealLube.

4.2 Threads may be cleaned with mineral spirits, soap and water, or other degreasing agents and allowed to dry. High-pressure air may be used to aid the drying process.

4.3 If steam is used to clean the threads they should be allowed to cool before SealLube is applied. Excessive heat may cause the SealLube to separate and affect its performance.

4.4 Cleaning is not necessary if the threads are protected by Preserv-A- Thread.

Warning: **Diesel fuel shall not be used as a cleaning agent.**

5.0 GENERAL FIELD APPLICATION - API CONNECTIONS

5.1 See Table 1 for the approximate amount of SealLube required per connection and the approximate number of connections covered per 250 ml tube.

5.2 SealLube should not be applied to pins or couplings until they are ready to be installed. Full make-up of hand tight coupling should occur within 5 minutes of the application of SealLube.

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5.3 SealLube may be applied directly from the tube to the connection using a standard caulking gun and duckbill applicator, then spreading with a brush, or by dispensing SealLube onto a clean non-metallic surface, such as plastic, dipping a brush into the SealLube then spreading onto the connection.

5.4 For 8 round pin threads, either casing or tubing, SealLube should be spread evenly and thinly over the entire thread surface from the chamfer to the thread runout.

5.5 For 8 round coupling threads, either casing or tubing, SealLube should be spread evenly and thinly over the thread surfaces from the start of the thread at the counterbore to within 4 thread turns from the center of the coupling.

5.5.1 For 8 round modified couplings, either casing or tubing, SealLube should be spread evenly and thinly over the thread surfaces from the start of the thread at the counterbore to within 4 thread turns from the center of the coupling.

5.6 For Buttress threaded casing pins SealLube should be spread evenly and thinly over the entire thread surface.

5.7 For Buttress threaded couplings SealLube should be spread evenly and thinly over the entire thread surface from the end of the coupling to within 1/2 inch from the center of the coupling. (2 1/2 thread turns)

6.0 GENERAL FIELD APPLICATION - PROPRIETARY CONNECTIONS.

6.1 SealLube shall be applied to Proprietary Connections the same as API compounds and /or manufactures procedure.

NOTE: For offshore use in deviated wells where the possibility exists that the string will have to be rotated to set the packer SealLube HTM-1001 is recommended on both mill and field threads. The enhanced torque properties of HTM-1001 will help prevent thread advancement during string rotation.

7.0 COUPLING INSTALLATION AND FIELD MAKE-UP

7.1 Complete power tight make-up of couplings or pin end field make-up should occur within 5 minutes of SealLube application.

7.2 Couplings should be installed hand tight then advanced to full power tight make-up position at a speed not to exceed 25 rpm.

7.3 Field end make-up is achieved by stabbing the exposed pin thread into the stabbing guide. After stabbing, remove the guide and start screwing by hand or apply power tongs slowly. To prevent galling the connections should be made up to full power tight make-up position at a speed not to exceed 25 rpm.

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8.0 EXCEPTIONS

8.1 Well conditions vary from location to location and at times it may be deemed necessary to modify these requirements. The Authorized Hunting Field Service Technician is trained to recognize these conditions and is authorized to modify these procedures as necessary to achieve the full performance level of SealLube.

9.0 PULLING AND RE RUNNING CASING AND TUBING STRINGS

9.1 It is often necessary to retrieve and rerun strings that have been made up with SealLube. When this is necessary follow these instructions.

9.2 During breakout of the field pin thread closely observe the coupling for any movement. If the coupling moves this indicates the SealLube on the coupling mill end has sheared and the coupling must be removed, mill end SealLube reapplied, and the coupling reinstalled when the string is rerun. Failure to do this could result in leaks.

9.3 While pulling the string clearly mark any coupling that has moved so the instructions in paragraph 9.2 above can be followed when the string is rerun.

9.4 API threads shall be reasonably clean when the string is rerun. Old excess SealLube on the threads may be removed by using a wire hand brush or stiff nylon brush. Some slight residue may remain in the thread roots after cleaning and is not detrimental.

9.5 The ineffective thread length (last 4-5 threads) on API 8 round connections and the coupling recess may have heavy accumulations of SealLube. It is not necessary to remove the SealLube completely from these areas since these are non contact areas. Remove loose accumulations with a wire brush.

9.6 Proprietary connections having metal to metal seal contact must have all SealLube removed from the seal contact surfaces. This is accomplished by using a stiff nylon brush. Do not damage the seals during the cleaning operation. Threads should be reasonably clean, however, some slight residue may remain in the thread roots after cleaning and is not detrimental to running or sealing integrity.

9.7 To rerun the string follow the SealLube application procedure defined elsewhere in this document for the type of connection being run.

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SEALLUBE USAGE TABLE
Single End Application

SIZE		JOINTS PER TUBE
2 3/8”	EUE	50
2 7/8”	EUE	35
3 1/2”	EUE	25
4”	EUE	21
4 1/2	EUE	18
4 1/2”	LTC	16
5”	LTC	13
5 1/2”	LTC	11
6 5/8”	LTC	8
7”	LTC	7
7 5/8”	LTC	6
8 5/8”	LTC	5
9 5/8”	LTC	4
20”	LTC	2
4 1/2”	BTC	11
5”	BTC	10
5 1/2”	BTC	9
6 5/8”	BTC	7
7”	BTC	6
7 5/8”	BTC	5
8 5/8”	BTC	5
9 5/8”	BTC	4
10 3/4”	BTC	4
11 3/4”	BTC	3
13 3/4”	BTC	3
16”	BTC	2
18 5/8”	BTC	2
20”	BTC	2

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SEALLUBE USAGE TABLE
Single End Application

SIZE			JOINTS PER TUBE
4 1/2”	LW STC	9.50#	28
4 1/2”	STC		19
5”	LW STC	11.50#	19
5”	STC		16
5 1/2”	STC		14
6 5/8”	STC		10
7”	LW STC	17#	14
7”	STC		10
7 5/8”	STC		9
8 5/8”	LW STC	24#	8
8 5/8”	STC		7
9 5/8”	STC		6
10 3/4”	LW STC	32.75#	8
10 3/4”	STC		5
11 3/4”	STC		5
13 3/4”	STC		4
16”	STC		3
18 5/8”	STC		2
20”	STC		2