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Location:	All	Reviewed By: <i>Leigh Redwine</i>	Approved By: <i>Matt Kutyna</i>		

## SCOPE

The following outlines the recommended practices for field handling, running, and pulling of tubular products with Benoit® BTS® Premium Connections and is intended to assist the user with correct installation. It is understood that actual procedures may vary depending on weather conditions, availability of equipment, and personnel. In any case, proper planning and careful execution are vital to a successful outcome.

## SPECIAL ALLOY

Special alloy tubing, such as those with Chrome (Cr) content greater than 9% and Nickel (Ni) based alloys, are much more susceptible to damage than carbon steel tubing. The following additional practices should be incorporated with their use:

- Prior to handling special alloy tubulars, all personnel involved should be briefed on the delicate nature of the product and how their duties should be conducted.
- Pipe racks should be coated with a non-metallic material.
- The use of a properly adjusted weight-compensator is strongly recommended during running and pulling of special alloy tubing.
- All movement should be closely monitored to avoid excessive metal-to-metal contact. No movement should take place without pin and box thread protectors in place.
- Prior to application of thread running compound, both the BTS® pin and box should be uniformly coated with dry moly spray lubricant and allowed to thoroughly dry.

## PRE-RUNNING PREPARATION

### *Tubing Preparation*

1. While tubing is on the storage rack, remove the pin and box protectors on only one row at a time.
2. If a drift test is to be performed, it should be done prior to cleaning and inspection of connections. Inspect the drift mandrel to ensure that it conforms to API requirements. Drift from the box end toward the pin end. Be very careful not to damage the connections during drifting. Items that do not pass the drift test should be clearly marked and segregated for further investigation.
3. Thoroughly clean, dry, and inspect the connections for damages in accordance with Benoit® Recommended Practice #BPT-RP01, "Field Inspection of Benoit® BTS® Connections". Any damages that can be field repaired should be done at this time. Joints with connections that cannot be field repaired should be marked accordingly and segregated to avoid unintended use.

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4. Records should be kept on all repairs and rejects.
5. Inspect the tubing ID for dirt or scale, and if present, remove with compressed air. Blow out tubing from the box end toward the pin.
6. If Protective Rings (BTS® “PR”) are to be installed it should be done at this time. Special installation tools are available for purchase or rental from Benoit.
7. Using a “moustache” type brush, apply a light, even coat of thread compound to the BTS® box and pin. Apply enough compound to evenly lubricate the threads and seals but do not allow large amounts to accumulate in the connection shoulders or fill more than 1/3 of the thread height (approximately 0.1 – 0.3 ounces). On special alloy material, apply dry moly lubricant to both pin and box prior to application of the thread compound.

*NOTE: Benoit® has standardized on using BOL-72733 thread running compound for BTS® connection qualification testing. Reference APPENDIX B regarding the use of alternative running compounds.*

8. Install clean, dry pin and box thread protectors prior to relocating the tubing.

*NOTE: If tubing is not used within a time  $\leq$  to 80% of the thread coating life, the tubing should be re-inspected to ensure that no rusting has occurred.*

### **Running and Handling Equipment**

1. Check the traveling block and rotary hole alignment.
2. Ensure that the slips are in good working condition, are fitted with the proper dies, and will accommodate the weight of the string.
3. Slip-Type elevators that are in good working condition, fitted with the proper sized dies, and that will accommodate the weight of the string should be used. Benoit does not recommend the use of bottleneck or shoulder type elevators.
4. Verify that the elevators are directly centered over the rotary hole when hanging from the traveling block.
5. The power tongs should be rated for 1.2 times the torque that is to be applied. Integral hydraulic backups are recommended. Both tongs and backups should be fitted with the proper sized dies and the dies must conform to the curvature of the tubing. If power tongs are not fitted with integral backups, the snub line must be at a 90-degree angle to the tongs and must be level. Verify that load cells are currently calibrated within a six-month span.
6. An employee on the stabbing board should be present to maintain vertical alignment throughout stabbing and makeup/breakout.

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7. Handling plugs should be utilized for the connection's protection and for personnel safety. Inspect the plugs for overall condition and for proper fit. If damages are present, such as galled or torn threads, the plug should be repaired or replaced. BTS® handling plugs should be manufactured such that the external shoulder makes full contact and there is no internal seal contact when mated into the box.
8. A stabbing guide should always be used when stabbing the pin into the box. It should be in good working order and provide adequate connection protection by preventing the pin from contacting the box face upon entry.
9. Clean, fresh thread compound should be on location in sufficient quantities. The compound must be kept covered between uses to prevent debris and moisture from entering the container.
10. A safety clamp in good working condition and sized for the tubing and accessories should be available.
11. Verify that the correct size drift rabbits are available.
12. If a pickup/laydown unit is to be used, the pickup arms, trough and backstop should be coated with rubber or another soft material. The use of nylon slings is acceptable.

### ***Tubular Accessories***

*NOTE: It is preferable to make in-string accessories up into assemblies, with pup joints on top and bottom, prior to delivery to location. This can be performed at Benoit's fully equipped torque & test facility. Each connection in the assembly is computer torqued with generation of a torque graph. After assembly, full-length drift, and pressure testing with water and/or gas, may be performed. This will virtually eliminate rig down time and connection damage from problems associated with different diameters and accessory lengths.*

1. All accessories that are to be part of the tubing string should be located and checked for compatibility with the string design.
2. If any accessories are not present, or do not conform to the string design, the appropriate end-user representative should be notified.
3. Any accessories that are similar, yet slightly different, should be clearly marked to indicate the position that they will be located in the tubing string.
4. If possible, all accessories should be drifted. Accessories with restricted IDs may also be drifted if prior arrangements have been made to have reduced size drift mandrels present.


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5. Note if any accessories will require additional makeup or handling equipment and verify availability on location.
6. Thoroughly clean and dry all accessory connections.
7. Visually inspect the connections for damages in accordance with Benoit® Recommended Practice #BPT-RP01, “Field Inspection of Benoit® BTS® Connections”. Any damages that can be field repaired should be done at this time.
8. Accessories with connections that cannot be field repaired should be marked accordingly and segregated to avoid unintended use. The end-user representative should be notified to ensure that replacement accessories are available for the tubing run.
9. If Protective Rings (BTS® “PR”) are to be installed it should be done at this time. Special installation tools are available for purchase or rental from Benoit®.
10. Clean, dry thread protectors should be placed back on all connections.

## **RUNNING AND PULLING**

### ***Running***

1. Ensure that thread protectors are in place and transport joints to the V-door using a pickup unit or a nylon strap attached to the box-end.
2. Remove the box protector from the joint in V-door that will be lifted for makeup.
3. Install a clean handling plug to the box connection. This will minimize the possibility of connection damage and reduce the chance of the pipe slipping through the pickup line. The handling plug should be wiped clean and visually inspected prior to each use.
4. If the tubing is to be rabbited, the rabbit should be placed in the tubing after installation of the handling plug. The handling plug will protect the connection from damage while drifting. Also, ensure that the rabbit is clean and dry before inserting it into the tubing.
5. A Slip type elevator is recommended. The joint should be raised at a moderate speed for both safety and protection of the tubing.
6. Remove the pin protector and rabbit from the joint hanging in the derrick. Re-distribute the thread compound on the pin connection if needed. If any debris is present, the pin should be wiped clean and thin even coating of fresh thread compound applied.
7. Remove the handling plug from the box connection on the joint in the rotary. Re-distribute the thread compound in the box connection if needed. If any debris is present, the box should be wiped clean, and a thin even coating of fresh thread compound applied.

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8. Place the stabbing guide onto the box connection.
9. The upper joint must be in true vertical alignment over the box of the joint in the rotary and must be in complete control before stabbing. Do not rock the pipe to stab.
10. Lower the joint hanging in the derrick. Carefully stab the pin into the box connection. If the connection is mis-stabbed, lift the joint, wipe the connections, and visually inspect for damages.
11. Remove the stabbing guide from the box connection.
12. Makeup the pin into the box by hand or, if necessary, with a strap wrench with a smooth even motion, leaving one-half to one turn before shouldering. During make up, the connections should be kept as closely aligned as possible (whether performing vertical or horizontal makeup). Do not force the joint to turn if excess resistance is encountered. This may indicate misalignment and could lead to galling. Counter-rotating the joint should allow it to drop into the thread form and allow for further makeup. If there is still resistance, unscrew the connections, and visually inspect them for damages or contaminants.
13. Position the power tongs on the pipe such that the tongs and backups are sufficiently above and below the connections. Ensure that the tongs are NOT biting on the connection transition or on the upset. Makeup the connections within the recommended torque range at **no more than 5 RPM**. If premature torque is noted, stop rotation immediately and verify vertical alignment. Restart makeup rotation. If premature torque is still present, back-out the connections and inspect for damages before proceeding.  
  
*NOTE: Reference APPEDIX A for torque graph acceptance criteria.*
14. After full torque has been achieved, remove the power tongs, latch the elevators onto the tubing string, and raise the traveling block at a slow speed. If the block is raised too rapidly, stretching and/or necking of the tubing may occur.
15. Pull the slips and lower the tubing string into the hole. When the string is in position for the next makeup, stop the downward movement and set the slips around the tubing. Gently set the string weight on the slips. Applying weight too rapidly may cause the tubing to stretch and/or neck-down in the slips.
16. Unlatch the elevators from the joint in the rotary. Hold the elevators far enough away from the joint to avoid contact and repeat steps 2 through 16.

### ***Pulling***

1. Install a handling plug into the box of the joint in the rotary and gently position & latch the slip-type elevators around the joint. Raise the block at a slow and even speed.

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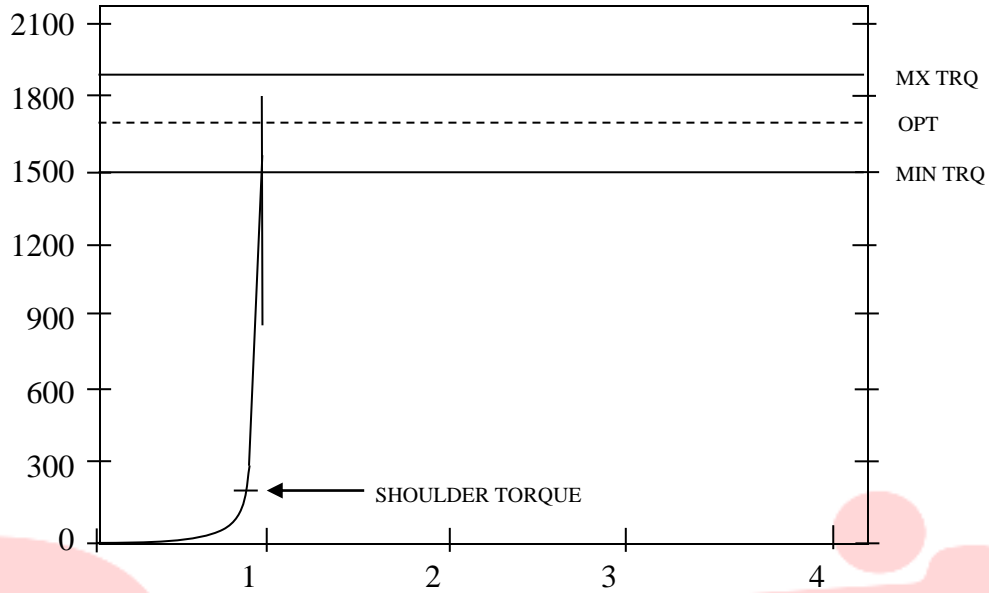
2. When the string is in position for connection breakout, stop the movement and set the slips in the rotary. Gently set the weight of the tubing string on the slips.
3. Unlatch the elevators and raise them above the joint to be backed out.
4. Have personnel on the stabbing board hold the joint to be backed out as close to true vertical as possible. The use of a weight compensator is strongly recommended during pulling operations.
5. Position the power tongs on the pipe such that the tongs and backups are sufficiently above and below the connections. Ensure that the tongs are NOT biting on the connection transition or on the upset. Breakout the connections in low gear at **no more than 5 RPM**. Do not break-out with connections in tension. Continue rotation until the pin “hops” once, then immediately stop rotation.

***NOTE: For connections on special alloy material: After initial break, rotate the connection approximately 1/4 turn, unlatch the power tongs and continue break-out by hand or with a strap wrench until the connection "hops" once. Stop rotation if excess resistance is felt and check for vertical alignment. The connections should turn freely after initial breakout.***

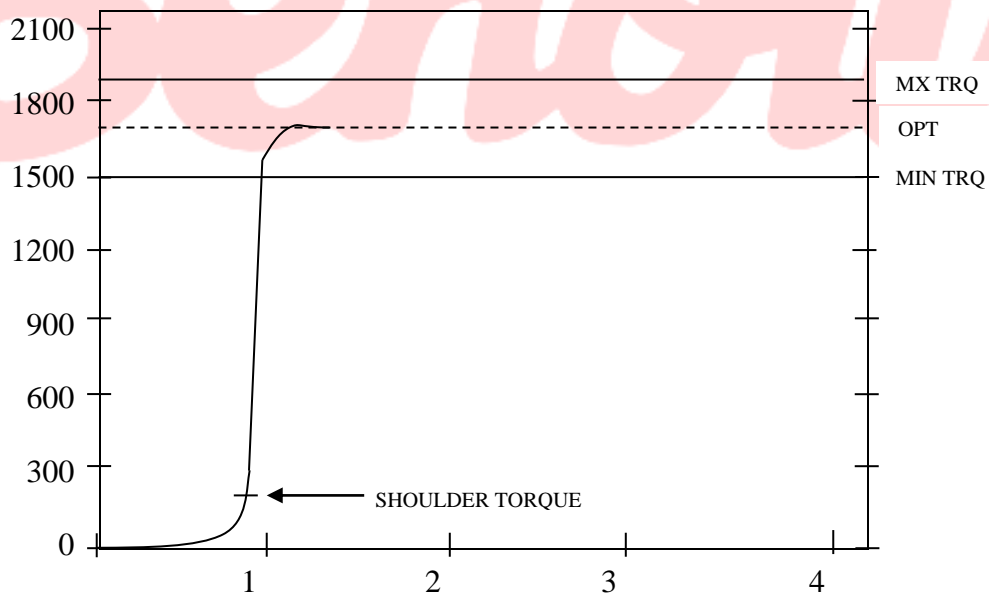
6. Attach the pickup line to the joint in the derrick.
7. Place the stabbing guide onto the box of the joint in the rotary to reduce the chance of jump-out damage.
8. Raise the traveling block to lift the joint. If the connection does not appear to be free, turn it counterclockwise one-half turn and try to lift again.
9. Apply fresh compound to the pin connection and install a clean thread protector.
10. Lower the joint into the V-door, remove the pickup line, and remove the handling plug from the box connection.
11. Apply fresh compound to the box connection and install a clean thread protector.
12. As soon as possible after pulling tubing out of the well, it should be thoroughly cleaned. The preferred method of cleaning is the use of a steam cleaner or hot-water pressure washer with no soap or solvent. If solvent is used it must be completely washed off before drying and applying thread compound. Do not use wire brushes.
13. Dry the connections and pipe ID using compressed air. Coat the connections with storage compound and install clean, dry thread protectors.

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**PPENDIX A – TORQUE GRAPH ACCEPTANCE CRITERIA**

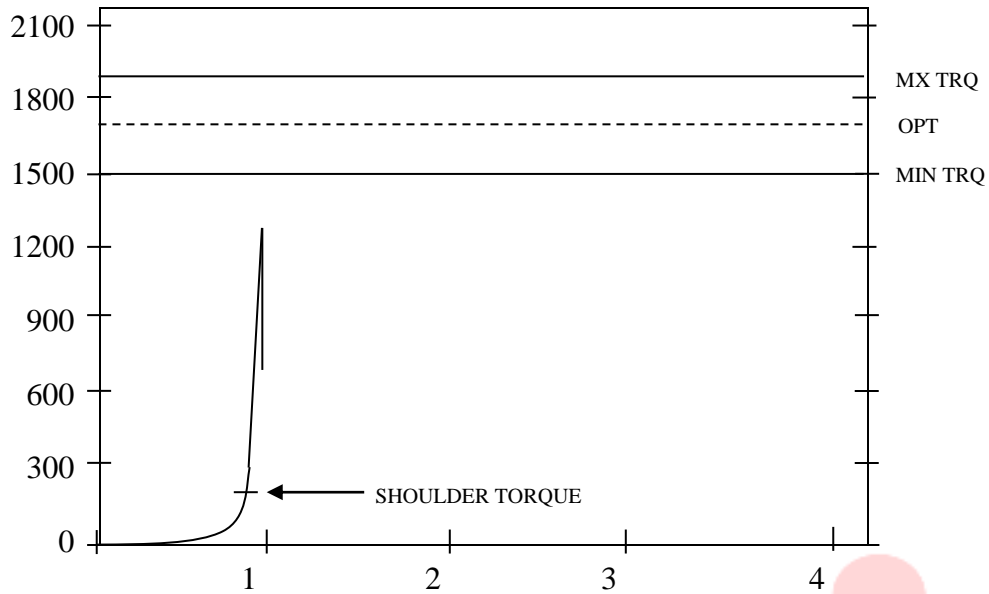


**Figure 1 - Typical Acceptable BTS® Torque VS. Turns Graph**

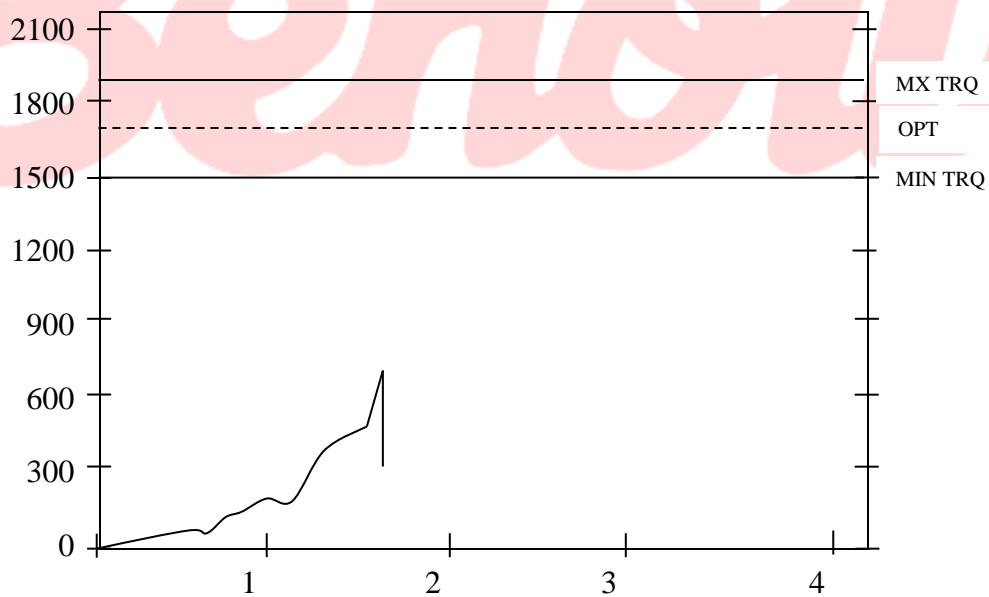


**Figure 2 – This graph indicates tong slippage or connection yielding. BTS® connections can withstand remarkably high torques before yielding. This type of graph normally indicates tong slippage. Breakout and evaluate.**

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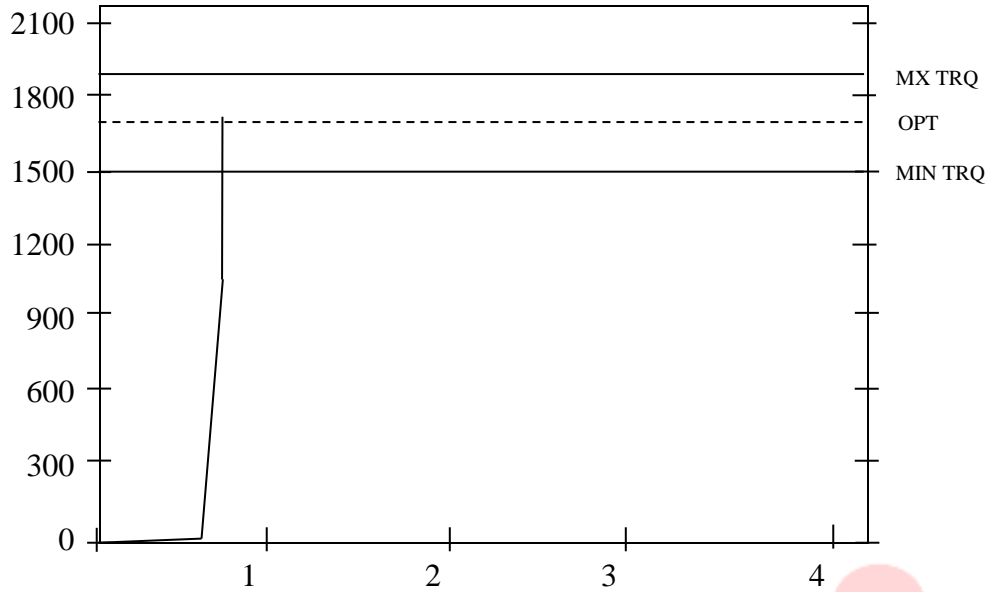
**Figure 3** – Minimum specified torque has not been obtained. Breakout and evaluate.



**Figure 4** – This graph indicates thread interference prior to seal engagement. Breakout and evaluate.



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**Figure 5** – This graph indicates little or no seal interference. Ensure that the “reference torque” of the computer monitoring system is set low enough to register seal interference. Breakout and evaluate.

## APPENDIX B – RECOMMENDED THREAD COMPOUNDS

For technical information, such as tubing and connection performance properties or torque data, visit Benoit’s web site at [www.benoit-inc.com](http://www.benoit-inc.com) or contact Benoit Quality Assurance Department at (985) 879-2487.

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The following recommendations are the result of numerous make and break tests on BTS® tubing connections using various thread compounds. ***These recommendations are not intended to endorse or promote any particular thread running product or company and will be updated as better running compounds are discovered.***

<b>FOR ALL CARBON GRADE TUBING:</b>	
<b>API Modified</b>	Bestolife 72733 Jet-Lube API Modified OCR 300 – API Modified
<b>Environmentally Safe (In order of preference)</b>	Bestolife PTC and PTC-ST Jet-Lube Seal Guard Jet-Lube Enviro-Safe

<b>FOR 13CR-80, 13CR-85, and 13CR-95 GRADE TUBING:</b>	
<b>API Modified</b>	Bestolife 72733 Jet-Lube API Modified OCR 300 – API Modified
<b>Environmentally Safe (In order of preference)</b>	OCR Liquid-O-Ring 167ML50 Bestolife PTC and PTC-ST Jet-Lube Seal Guard

<b>FOR HYPER AND SUPER 13CR-110 GRADE TUBING:</b>	
<b>API Modified</b>	Bestolife 72733 Jet-Lube API Modified OCR 300 – API Modified
<b>Environmentally Safe (In order of preference)</b>	OCR Liquid-O-Ring 167ML50

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For all 13CR material, prior to application of the thread running compound, Benoit® recommends that a uniform coating of dry moly be sprayed onto the pin and box connections and allowed to dry.

Also, make and break testing performed on various size, weight, and grade connections has shown that using a thread compound with a torque factor less than API Modified (less than 1.0), causes no noticeable difference in connection make-up on BTS® connections. Therefore, Benoit Premium Threading, LLC recommends that the final make-up of BTS® connections be within the torque ranges listed in Benoit’s tech data pages with a tong speed of 5 RPM or less.

BTS® performance properties, as well as Benoit’s Recommended Running Procedure for BTS® connections, can be found on our website at [www.benoit-inc.com](http://www.benoit-inc.com) or by calling (985) 879-2487 to obtain a copy by fax or mail.

Bestolife Corp.            1-800-527-9452            [www.bestolife.com](http://www.bestolife.com)

Oil Center Research    1-800-256-8977            [www.oilcenter.com](http://www.oilcenter.com)

Jet-Lube, Inc.            1-800-538-5823            [www.jetlube.com](http://www.jetlube.com)

