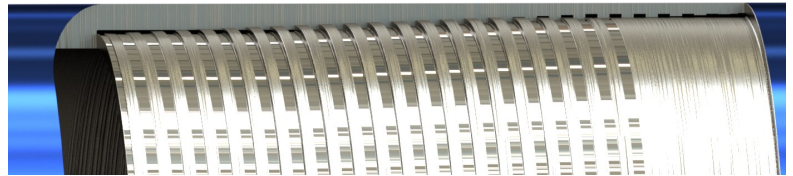
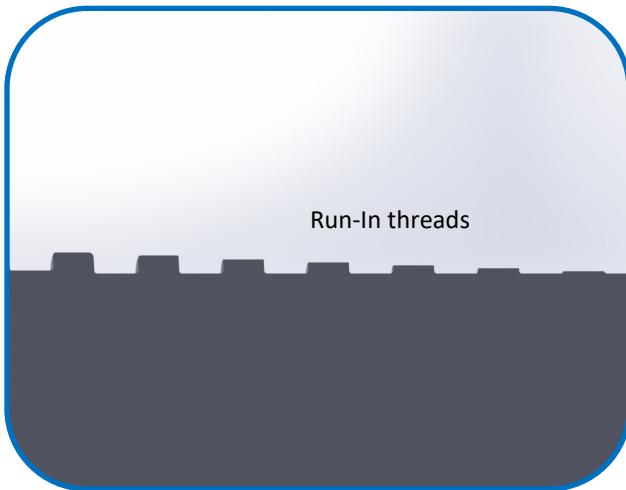


The HYDRA Flush Joint is a true flush joint that is formed onto plain end pipe with a swaged pin end. It is typically stronger in a straight pull than traditional flush joints and can take more bending. It is not interchangeable between different weights of the same pipe diameter. Crossovers are necessary between different weights or diameters.

It is a run in / run out style thread. The imperfect starting threads are clipped /topped in lead to fit into the roots of the run out threads. This increases the pull strength and makes the HYDRA easily identifiable.

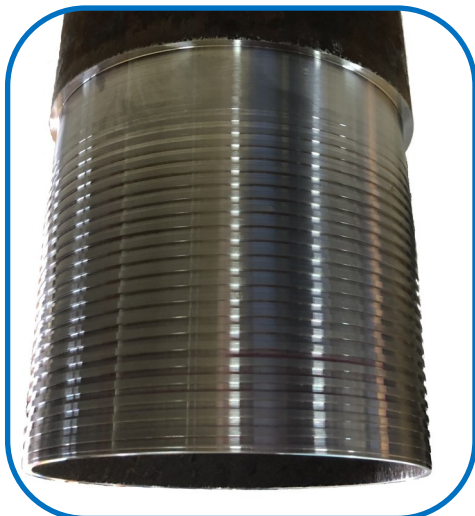
The connection typically has moly coated pins and boxes but in some instances may be phosphate coated, especially on accessories. In some instances the surface may be blasted by sand or alumina and may be dull in appearance.



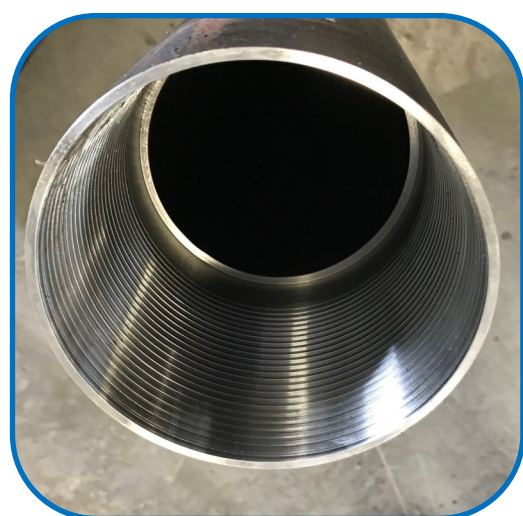
The threads are special patented stepped square threads. The box thread form differs from the pin thread form but both are essentially square.



Pin–Before Moly Coat



Box–Before Moly Coat



Thread Compound Application

A moustache brush is recommended because of its ability to evenly apply thread compounds and its unique angle which aids fully coating internal threads and seal. The brush should be kept free and clean of debris and liquids that would adversely affect the thread compound. Likewise, the container with the thread compound shall remain free of contaminants. Oil based muds can thin out the grease in the thread compound which can cause galling or premature connection yielding.

A light coat should be applied to the threads and shoulders of the box and pin. The area behind the threads shall be lightly doped with thread compound; the entire box area shall be coated. The coating should be light and cover no more than 1/3 of the thread height. Alternately, the box can be fully coated and the shoulders of the pin can be coated. The alternate leads to less thread compound squeeze and a faster run but may lead to undesired wear when running as tubing.

Best of Life 2000, Best of Life 72733, JET-LUBE® RUN-N-SEAL®, Klüberlub OCTG LF HT are the recommended running compounds. Other proprietary thread compounds may be used that are API Bulletin 5A2 compliant and / or equivalent. Artic grades are recommended for cold weather applications. Green-Seal II Thermal is recommended for high temperature steam injection wells.



Mustache Brush

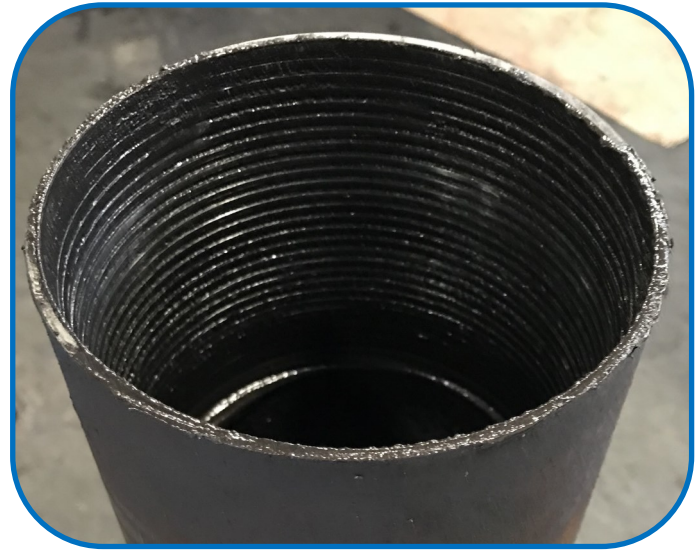
Pipe OD (in)	Dope (cm ³)	(in ³)	Dope Weight Approximate		
			Weight (lbs)	Weight (Ounce)	Weight (grams)
2 3/8	9	0.55	0.038	0.60	17
2 7/8	10	0.58	0.040	0.63	18
3 1/2	10	0.61	0.042	0.67	19
4	11	0.69	0.047	0.75	21
4 1/2	12	0.76	0.052	0.83	24
5	19	1.14	0.078	1.25	35
5 1/2	20	1.22	0.083	1.33	38
6 5/8	24	1.45	0.099	1.58	45
7	32	1.98	0.136	2.17	61

Approximate weights and volumes for application are listed below for reference.
Roughly equal amounts are applied to the box and pin.

Thread Compound Application

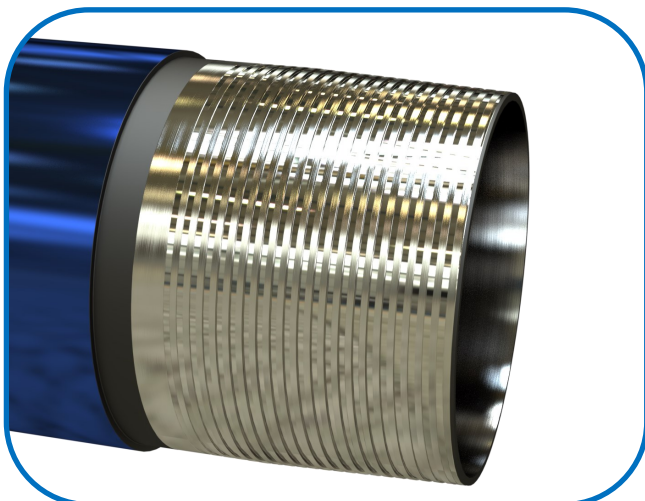


The pins should be fully coated with thread compound as well as the shoulders. Recommended to prevent any chance of galling and to enable re-running this connection as tubing.



The boxes shall be fully coated as well as the shoulders.

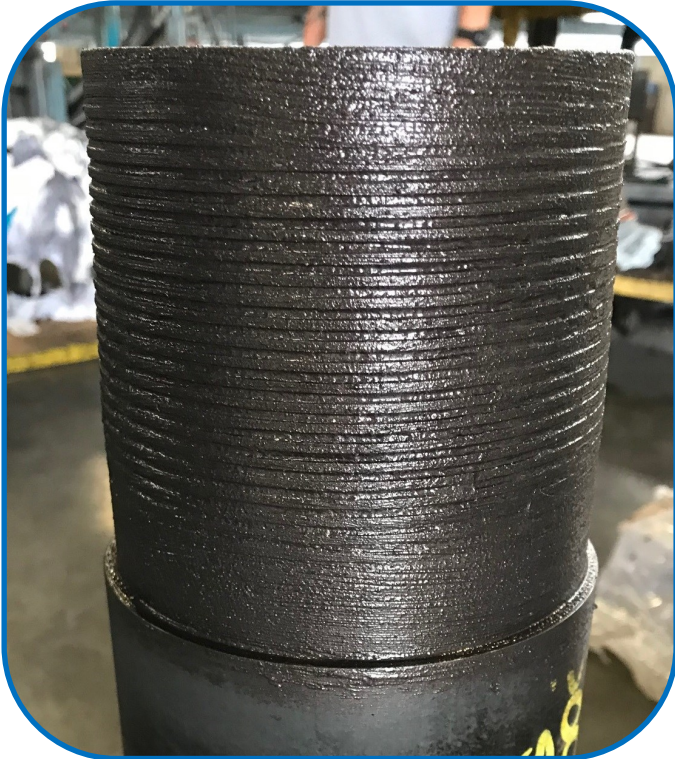
!Caution! CBR "Corrosion Barrier Ring Boxes are not coated with thread compound. Pins only. This is done to prevent dope squeezing the rings inwards!



Alternate thread compound application for the pin.

The alternate way to apply thread compound to a HYDRA Pin is to dope the seal areas. The darkened areas on the photo (left) depict the regions where the compound is required. Pin nose and first thread plus the rear shoulder. Warning! This may cause undesired wear if used as tubing. **!This does not apply to CBR "Corrosion Barrier Rings"!**

Thread Compound Application–CBR “Corrosion Barrier Rings”



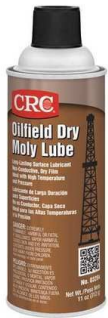
The pins should be fully coated with thread compound as well as the shoulders. Recommended to prevent any chance of galling and to enable re-running this connection as tubing.



!Caution! CBR “Corrosion Barrier Ring Boxes are not coated with thread compound. Pins only. This is done to prevent dope squeezing the rings inwards into the pipe body!

If doping is necessary coat only half the threads starting from the face of the box so the dope squeezes out of the box and not into the pipe ID.

The HYDRA Flush Joint has moly coated pins and boxes for short term preservation and galling protection. The dry moly helps adhere the thread compound uniformly to the connections. It is also a short term solution to slow down rusting and pitting on a dry connection after cleaning and inspection. The examples below depict a good dry coating.



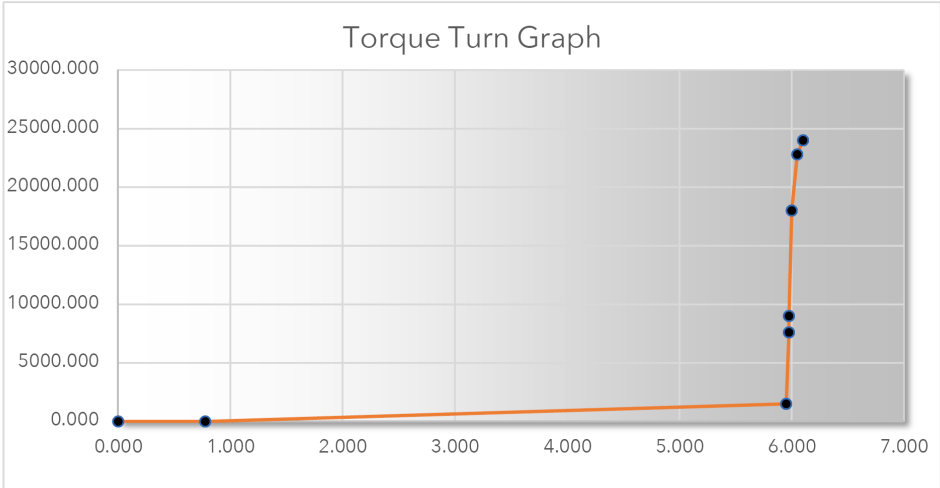
The threads and shoulders shall be coated on the pins and boxes. All machined surfaces are contacting surfaces and shall be coated. Allow coatings to dry before applying thread compounds.



The following torque graphs are supplied to aid in the running of the HYDRA Flush Joint. The values provided in the technical data sheets are determined by laboratory testing at standard room temperature in a clean environment with perfectly made pipe and perfectly aligned and calibrated tongs. Your conditions will vary, but these guidelines can help to troubleshoot common problems.

- Shoulder Torque:** Point on the graph where the torque spikes dramatically when the connection shoulders make contact. Must be visible on the graph to verify proper make-up. Shouldering at zero torque is rejectable.
- Yield Torque:** Torque that crushes the connection shoulders / torque stops. Generates a lot of heat due to friction.
- Optimum Make Up Torque:** Recommended torque to ensure pressure integrity, breakout capability, minimum wear and good structural stability. The value is between Minimum and Maximum Make Up Torque.
- Minimum Make Up Torque:** Lowest recommended assembly torque.
- Maximum Make Up Torque:** Highest recommended assembly torque. Exceeding this value can make it difficult to re-run the connection if the casing string must be tripped out. It is best to leave the connection together if this value is only slightly exceeded.
- Max Operating / Rotating Torque:** Maximum torque when rotating a casing string under load.
- Thread Locking:** Add 10% to the optimum for make-ups using thread locking compound (Baker Lok).

Min Make Up Torque	7,600	ft-lbs	Nom Shoulder Torque	1,500	ft-lbs
Max Make Up Torque	18,000	ft-lbs	Max Operating	22,800	ft-lbs
Optimum Torque	9,000	ft-lbs			





Make-Up

Initial rotation should begin in high gear with a low torque. Ensure the make up is not biting into the thread.

The last 2 turns should be done in low gear so the thread engagement appears in the torque turn graph. This also allows a good graph of the shoulder.

Once the threads pick up torque the tongs should remain in low gear and at a constant RPM. Recommended RPM's are listed in the table below. They may be modified to achieve a better graph (generally slower).

Buck On RPM

Pipe OD (in)	Initial RPM	Final RPM
2 7/8	30	15
3 1/2	30	15
4	20	10
4 1/2	20	10
5	20	10
5 1/2	20	10
6 5/8	15	8
7	15	8

The shoulder torque shall be clear and defined. There must sufficient delta torque to find the shoulder. The shoulder shall be less than the minimum make up torque. Generally 0.020 – 0.100 delta turns is expected. Check rig alignment If shoulder is too high.

For shoulder torques that are not within spec break out the connections and inspect.

Any large torque increase before reaching the shoulder may indicate cross threading or galling.

Rotating

DO NOT rotate above the maximum operating torque.

Use the minimum amount of torque necessary to break downhole friction between the tubing or casing and the well bore.

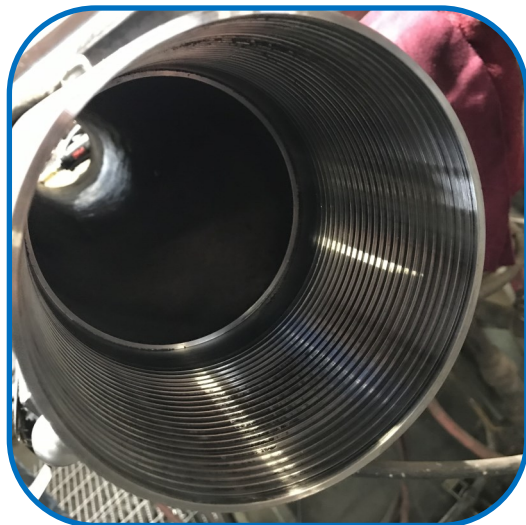
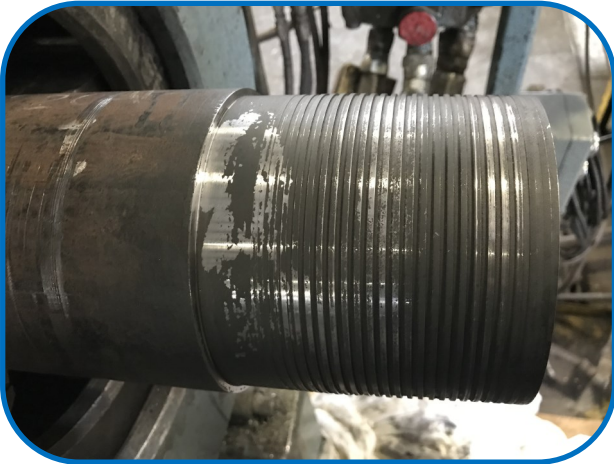
Gradually increase and decrease torque to avoid impact loads from winding up the string. Backlash may part the string or rotational inertia may over-torque the connection.

The RPM should be limited to 30 RPM or lower. Doglegs that are 20°/100 ft. or less may be rotated up to 24 hours without fear of fatigue as long as the speed is at or below 30 RPM.

Re-makes and Repairs

- After break out, the pin and box must be thoroughly cleaned and inspected for any damage.
- Some connection repair is allowable using scotch brite, a fine file, stone or sand paper. Remove all sharps, raised edges or burrs from the threaded areas.
- Trained technicians may make decisions regarding the serviceability.
- The shoulder faces must be free of damage that would cause leaking. The shoulders may be lightly cleaned with scotch brite and re-mollyed as long as the intent is to remove minor surface scratches, excessive moly or prepping areas where the moly has worn off from repeated make-ups.
- Run in and Run out threads should be smooth to the touch since they receive the most abrasion on make up.
- Check the Box OD for signs of over-torque before deciding to re-run.
- Once repaired the connection should be sprayed with an even coat of "dry moly" and allowed to dry.

Expected Wear Box and Pin



Required Equipment

Stabbing guides and **Handling plugs** are required for running the HYDRA. Stabbing guides protect the box face from rejectable damage during a stab. Handling plugs are necessary to lift joints onto the rig floor. **Slip type elevators** are required for elevating the casing string and running the HYDRA which is a true flush joint connection. The handling plugs are not rated to lift the entire casing string. Handling plugs are rated to lift no more than 100 ft of pipe. **Torque Turn Monitoring Equipment** is required to ensure proper make-up. **Crossover** (Generally LTC coupling Box up to HYDRA pin down.). **Dry moly Lube** for repairs and re-makes.

Stabbing Guide



Handling Plug





Supplemental Running Instructions

Rig Site Preparation

- The traveling block should be aligned with the well bore. Prevents side loading connections during make up and causing high shoulders, especially for shorter high dollar equipment at the beginning of the run.
- Verify that the wear bushing has been pulled or that the I.D. is sufficient to pass all string components.
- For your safety, verify that the B.O.P.'s have been fitted with the proper size pipe rams.

Running and Handling Equipment

- Ensure that the slips are in good working condition, are fitted with the proper size dies, and will accommodate the weight of the string.
- Ensure that the elevators are in good working condition, are fitted with the proper size dies, and setting plate and will accommodate the weight of the string. Do Not use bottleneck elevators. Only use slip type elevators.
- The power tongs should be rated for the torque that is to be applied. They should be fitted with the proper size and type of dies, and the dies should conform to the curvature of the tubing. Tongs equipped with an integral hydraulic backup are recommended. If it is not available, the snub line should be at a 90-degree angle with the tongs and level.
- Torque Turn monitoring Equipment is required.
- If available, a single joint compensator should be used to reduce the bearing weight applied to the mating threads. This unit should actually be able to float the joint during make-up and have the ability to provide movement needed during thread engagement.
- Handling plugs and Stabbing guides should be utilized for connection protection and personnel safety. They should be inspected for overall condition and checked manually to insure proper fit.
- Thread compound, which is approved by the threading manufacturer, should be on location in sufficient quantities. The appropriate applicators should also be present.
- A safety clamp should be available. It should be in good working condition and sized for the tubing and accessories.
- A T.I.W. valve rated for the maximum anticipated pressure should be on location. If the valve connections are not compatible with the tubing connections, crossovers to all connections being run should be present.
- A pickup line in good condition should be used. It may be constructed of rope or nylon. Insure that whichever material is used is rated for the weight.
- If a pickup/lay-down unit is not used, the catwalk and the vee-door should be covered with wood. If a pickup/lay-down unit is used, the pickup arms, trough and backstop should be coated.



Running Singles

- Gently roll one joint at a time into the pickup trough. Do not allow joints to contact one another with momentum as damage to the connections can occur.
- Insure that thread protectors are snug on the pin end and transport the joint to the rig floor.
- A clean handling plug should be installed. This will reduce the possibility of the tube slipping out of the pickup line and reduce the possibility of the test tool or elevators damaging the connection.
- Attach the pickup line and raise the joint at a moderate speed, for both safety and tubular protection.
- Remove the pin end protector inspect/re-inspect the pin end connection. If any debris is present, the pin connector should be wiped, or blown clean. Re-moly as necessary and allow to dry.
- Apply thread compound to the pin end connector.
- Remove the handling plug from the box end in the rotary.
- If debris is present, the box connection should be wiped, or blown clean. Moly if necessary and allow to dry.
- Apply thread compound to the box end connector. Application of thread compound shall cover all thread seal and faces/shoulders.
- Place the stabbing guide over the box end connector.
- Slack off of the joint in the pick up line. The joint should be lowered slowly to minimize thread damage.
- The stabber should stab the joint and hold it as close to true vertical as possible at all times. Note: He should be advised not to hold the handling plug. Doing so might cause the handling plug to unscrew when turning the tubing.
- Remove the stabbing guide and the pick up line.
- Apply the power tongs and begin makeup at no more than five to ten R.P.M.'s. If torque is achieved prematurely, stop makeup immediately and check vertical alignment. Attempt makeup again. If premature torque is still present, back out the connection and check for damage. Repair or lay the joint aside and proceed.
- As torque is encountered in an acceptable makeup, tong speed should be slowed to three to eight R.P.M.'s. The shoulder torque should be visually verified on applicable connections. Peak torque should be achieved as slowly as possible. This will allow the torque to be transmitted through the mechanics of the tongs and be applied to the connection.
- Remove the power tongs, and review the torque turn graph. Back out any connections where the graph indicates a potential problem.



- If testing above the rotary, insert the internal test tool or apply the external test unit. You should not perform this step until Full torque has been applied to the connection.
- After full torque has been achieved, latch the elevators as gently as possible, and raise the block at a slow speed. If the block is raised too rapidly, swaging of the tubing might occur.
- Pull the slips and lower the string.
- Stop downward movement of the string and, either set the slips or firmly hold them around the tubing. Assure that the slips are set or are placed correctly and gently set the string weight on the slips. Applying weight too rapidly may be the cause of mashed or swaged tubing.
- Attach the pickup line to the next joint to be run and unlatch the elevators from the last joint run. Hold the elevators far enough away from the joint in the rotary to prevent contact, and raise the block at a moderate speed.

Pulling Singles

- Install handling plugs, gently latch the elevators around the joint in the rotary, and raise the block at a slow even speed.
- Stop movement of the string and either set the slips or firmly hold them around the tubing. Assure that the slips are set or are placed correctly and gently set the string weight on the slips.
- Unlatch the elevators and raise them above the joint to be backed out.
- Have the stabber hold the joint to be backed out as close to true vertical as possible.
- Apply power tongs and slowly apply torque until the connection breaks. Slowly back out the connection (5 R.P.M.'s) until most of the interference is no longer present. Remove the tongs. Finish back out by hand or strap wrench. Stop when the connection "hops" once.
 - Attach the pickup line.
 - Note: If available, a single joint compensator should be used to reduce the bearing weight applied to the mating threads. This unit should actually be able to float the joint during breakout and have the ability to provide movement needed during thread disengagement.
 - Latch the stabbing guide around the box end to reduce jump out damage.
 - Gently raise the joint. If the connection does not appear to be free, turn counter clockwise one half turns and try to lift again.
 - Dope the pin connection thoroughly and install a clean thread protector.
 - Slowly set the joint in the vee-door.
 - Remove the pickup line and the handling plug.
 - Re-install thread protectors and move to racks.