中信泰富特钢
CITIC PACIFIC SPECIAL STEEL

天津钢管
TIANJIN PIPE

Running Service Manual

CITIC TPCO

Premium Connections

CONTENTS

CITIC TPCO Field Practice

1 General Information

This document proposes the recommended procedure of proper running and handling pipes with CITIC TPCO premium connections. The recommended method offers a way to ensure successful make-up and installation, and to avoid damages to pipes and connections caused by inappropriate use, inappropriate running operation and inappropriate transport.

2 Preparation before running

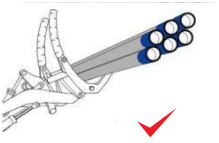
2.1 Transportation,Slinging and Storage

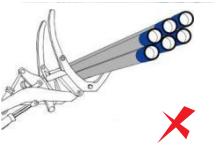
2.1.1 Transportation

- The pipe should fit a protector during transportation and be fixed to avoid slipping and collision.
- During transportation, the pipe should be placed in the same direction.

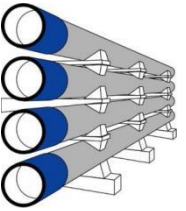
2.1.2 Slinging

- The protector should be fitted during the hoisting of the pipe.
- It is recommended to use a sling to lift the pipe. Do not lift only one end of the pipe to avoid pipe slip.
- It is strictly forbidden to use steel hooks to lift the protector at both ends, so as not to damage the protector and damage the sealing surface and threads.
- Rough loading and unloading is strictly prohibited.
- When the pipe handling machine is used for loading and unloading, the grab arm should be equipped with protective sleeve.





2.1.3 Storage

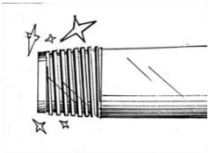


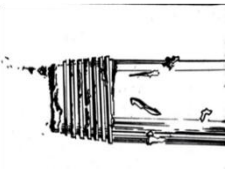
- All connections should be protected by thread protectors at all times.
- The bottom pipes should be at least 0.5m(1.65 feet) high from the ground, and the stacks should be no higher than 2m(6.56 feet).
- A sufficient number of strong separators (more than 3 per layer) are required for spacing and support.
- The separators should be placed on the same level and maintained at a suitable levelness.
- The separators should be placed vertically from the pipes and keep in alignment, so as to prevent the pipes from bending.
- Prevent moisture. Rain -proof must be taken for long-term stacking.
- If the pipes are stored in the warehouse for more than 6 months, it should be re-maintained.

2.2 Inspection

2.2.1 Cleaning

- All the threads of pipes prepared for running should be perfectly cleaned.
- A non-metal brush should be used to clean the threads.
- Special detergent or high temperature and high pressure steam should be used for cleaning. It is forbidden to use diesel or gasoline.
- After cleaning, use cotton yarn to remove the residual water on the thread. keep it dry and pay attention to rain prevention to avoid rust.
- The protectors should also be thoroughly cleaned after removal and remake up onto the cleaned threads until running begins.





2.2.2 Drift

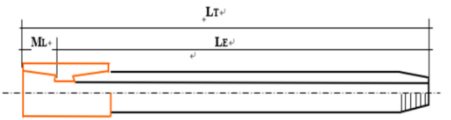
- Full length drift before running.
- Ensure that the internal surface of the pipe is clean and free of obstructions.
- The dimensions of the drift mandrels shall meet the requirements of the standard. In order to avoid pin seal damage and the contamination of box threads, the recommended practice is to drift from box end to pin end.

Dimensions of Standard Drift Mandrel					
Pipe Size Range		Min. Drift Mandrel Length		Min. Drift Mandrel Diameter	
Product	in	in	mm	in	mm
Casing	< 9-5/8	6	152	d-1/8	d-3.18
	9-5/8~13-3/8	12	305	d-5/32	d-3.97
	> 13-3/8	12	305	d-3/16	d-4.76
Tubing	≤ 2-7/8	42	1067	d-3/32	d-2.38
	> 2-7/8	42	1067	d-1/8	d-3.18

Note：Special Drift depends on customer's requirements.

2.2.3 Length Measurement

- All pipes to be run should be measured using a steel tape with millimeter accuracy.
- Effective length (LE) = Total length (LT) - Make-up Loss (ML)



- TP series: Please refer to related

Connection Data Sheet.

2.3 Auxiliary Equipment

2.3.1 Power tong

- The power tong should be in a proper and safe working conditions. The jaws should fit the outside diameter of the pipe. It is recommended to use an integral tong which is one with a backup tong. The power tong shall be capable of controlling the rotational speed with a minimal rate of 3 rpm, accurately measuring and controlling makeup torque and turns. The torque-measuring device shall be calibrated prior to start of the job. The tong shall have a capacity of about 1.5~2 times of the optimum torque.
- The snub line of the load cell shall be perpendicular to the arm of the tong. If not, the indicating value of the makeup torque should be correspondingly corrected.

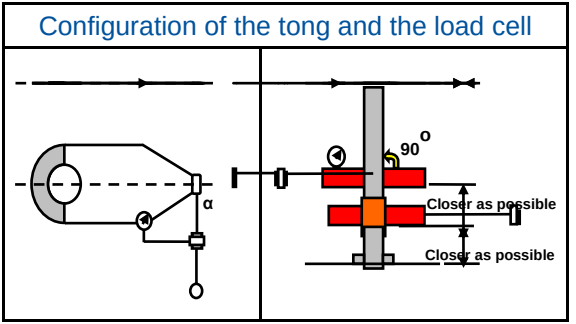
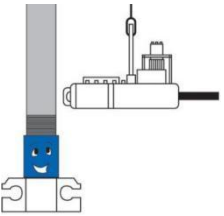
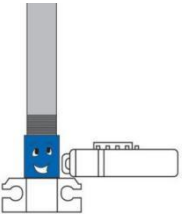


Table 1: Angle of the snub line and torque correction factor

α (o)	90	85/95	80/100	75/105	70/110	65/115	60/120	55/125
Correction factor	1.00	0.99	0.98	0.97	0.94	0.92	0.87	0.82

Note: Value of makeup torque at the snub line's angles other than 90° = Value of torque at 90° angle / correction factor.





2.3.2 Accessories and common tools check

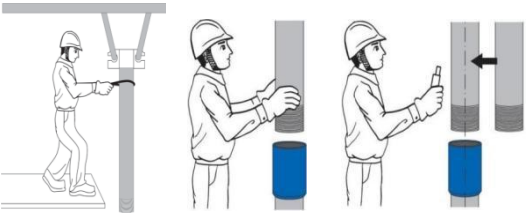
- Check all accessories, such as crossovers, grading collar, float shoe, float collar, hanger, etc.
- For accessories from different manufacturers, it shall be confirmed that the accessories are made of the same material as the casing to avoid corrosion of the string due to different materials of each section of the string during subsequent operation.
- Elevator: check whether the elevator specification match with bearing weight, whether the bearing surface is uneven worn, and whether the closing switch is

intact.

- Safety slip, pneumatic chuck：used for TP-NF3 slim coupling, TP-FJ/II flush joint, TP-SFJ,TP-ISF,TP-ITB upset flush joint, big OD pipes with weight over 80 ton.
- For corrosion resistant alloy, the elevator and slip shall be equipped with wear-resistant rubber. It is recommended to use long and wide toothless slip teeth.

2.4 Check the wellhead

- The center line of the wellhead rotary device shall be in alignment with the main hook vertical line as much as possible.
- Wellhead offset will increase the difficulty of stabbing and make up. Centralizing measures should be taken for large deviation wellhead.

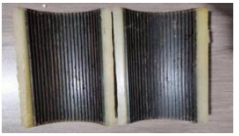


2.5 Prevention of high-alloy iron pollution

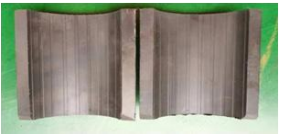
Stainless steel and nickel-based alloy because there is a passivation film on their surface to achieve the purpose of rust prevention, so in the use of stainless steel and nickel-based alloy oil casing process, should avoid the oil casing and carbon steel direct contact, to avoid damage to the passivation film caused by electro-chemical corrosion reaction.

- Non-metal soft spacer should be used during transportation, lifting and storage;
- Nylon drift mandrel should be used when drifting;
- Power tong should use minor jaw mark dies and toothless dies;

- Copper plated elevator should be used in well running;
- Avoid direct contact with all carbon steel accessories.



minor jaw mark



toothless dies

minor jaw mark

Copper plated elevator

3 Running process

3.1 Dope and applications

3.1.1 Inspection

- Whether the dope is packaged well, in the validity period, and in accordance with API RP 5A3;
- Whether the dope is used for casing and tubing;
- Whether the dope satisfy TPCO requirements;
- Check the dope friction factor;

3.1.2 Application preparation

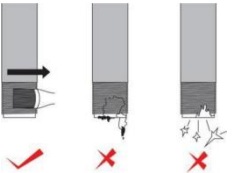
- Avoid foreign objects falling in dope bucket such as mud;
- Stir fully for thread dope;
- Check if the connection is clean enough;
- Use clean, non-shedding and firm brushs;

3.1.3 Application on rig site

Dope should be applied even and cover all surface of thread and seal area.After application, the thread profile should be

observed. It is recommended to apply on both pin and box side.

Thread Compound



3.2 Lifting

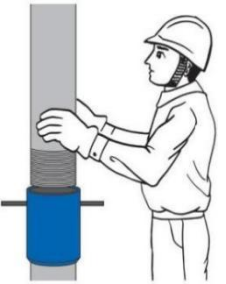
- Fit protectors during lifting, do not take it off；
- Recommended to use the method of pipe passing in the air with single truck crane or two winches；
- The thread collision shall be avoided during lifting. After the elevator is buckled, it shall be lifted steadily. Buffer ropes shall be used. In case of collision, the thread shall be checked；

- For corrosion resistant alloy, pipe passing in the air shall be adopted. During lifting, non-metallic cushion shall be ensured between pipe rack and handling equipment to prevent the pipe from contacting other steel objects. Steel belt and steel sling shall not be used.
- Slip type elevators are recommended for longer, heavier strings. The dies and slips should remain clean and free of damage.
- If collar type elevators are applied, carefully check its bearing surface:

(1) check for signs of any uneven abrasion or wear since this may cause the coupling to rise at one side and its eventual failure.

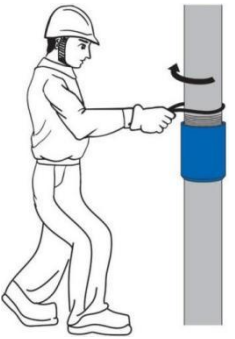
(2) check if the load is evenly distributed when the load is applied onto the bearing surface.

3.3 Stabbing



It is recommended to use a stabbing guide which assists pin end penetrated into the coupling end of the casing pipe. Before running, make sure the stabbing guide inside diameter matching with the pipe outside diameter, and check conditions of the rubber block.

3.4 Make up guiding



The suspension method is adopted to make sure the weight of the whole casing mainly borne by the hook rather than pressing on the thread. It is strictly prohibited to place the pin end face directly on the coupling；

When the axes of the upper and lower pipes aligns,rotate the pipes. The guiding process torque should be less than 1000NM,and the tail rope of the tong should be loose. If the torque increases unexpected, stop the rotation immediately, and check whether there is a cross-thread or hard object inside. For this situation, break out and lift the casing, then carefully check whether the thread is damaged. If any damage found, use oilstone to repair it. If it cannot be repaired, lay down the pipes；
For the high alloy tube, tighten it by hand until it can not rotate then use the power tong to finish the makeup.

3.5 Make up

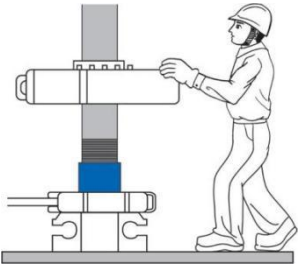
When the hanging weight of the string is small, the backup tong shall be used to avoid sliding and placed at the lower half of the coupling；
If different thickness or grades connections are make up together, the smaller makeup torque of the two shall be applied；
During the process of making up at the oilfield

site, if the backup tong clamped on the next casing, the factory end of the casing may rotate together, which does not mean that the factory end is too loose, but that the field end has reached the factory end torque.

Material	Speed requirements at the beginning period		Last period of make up
	First 2-3 rounds	After2-3 rounds	Power tight
Carbon steel and low alloy steel	Hand tight or low speed	High speed max 25 rpm	Low speed, max 5 rpm
high alloy steel	Hand tight until cannot rotate		Low speed, max 3 rpm

1 Make-up speed requirement: First 2-3 turns≤5rpm，After 2-3 turns≤25rpm， last 2-3 turns ≤5rpm.

2 When abnormal situation happened，operation should stopped immediately ，check and ensure there is no damage on connection，apply the dope again and re-make up.



3.6 Accept and Reject Criteria

Reject Criteria / Disposition

- All rejected make-ups, which require break-out according to the handling procedure, the connections shall be thoroughly cleaned and evaluated. If no damage occurs, the connection can be remake-up. Connections shall not be make up more than 3 times. If acceptable graph doesn't appears within 3 make-ups, the pipes shall be rejected and shall not be used again.
- Connections can be reused, if follows does not occur,:

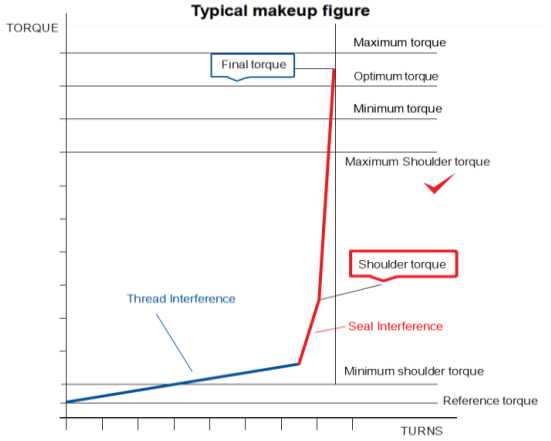
(A) No galling on the thread of the connection.
(B) No galling on the seal of the connection.
(C) No shedding of the plating on the seal

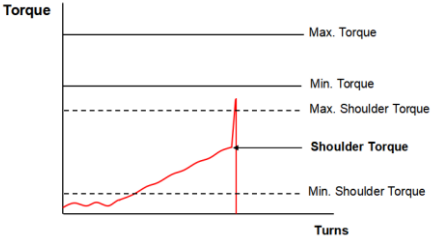
(D) No exposition of the base material on the seal with plating,The visible friction marks on the seal of the connection are acceptable.

Note：Proper operation is always required for all kinds of monitoring system.

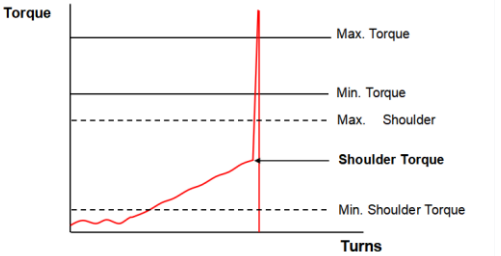
3.6.1 For TP-JC connection reach the set torque value, and coupling face should between triangle mark top point and 1 round to base line.

3.6.2 For gas tight connection with shoulder, Torque graph requires obvious shoulder point, pin and box shoulder get in touch, shoulder torque value is inside the require range.


Typical makeup figure
TORQUE
Maximum torque
Final torque
Optimum torque
Minimum torque
Maximum Shoulder torque
Shoulder torque
Thread Interference
Seal Interference
Minimum shoulder torque
Reference torque
TURNS

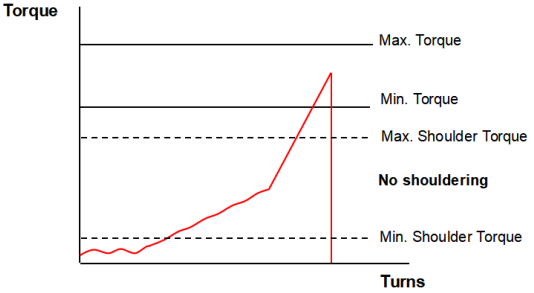


Minimum specified torque is not obtained. Break out and evaluate.



Maximum specified torque is exceeded. Break out and evaluate.

If the minimum specified make-up torque is not reached, or the maximum specified make-up torque is exceeded, the the connection shall be broken out, cleaned, inspected and if it is not damaged, redoped and re-madeup



Torque shoulder does not engage. Break out and evaluate

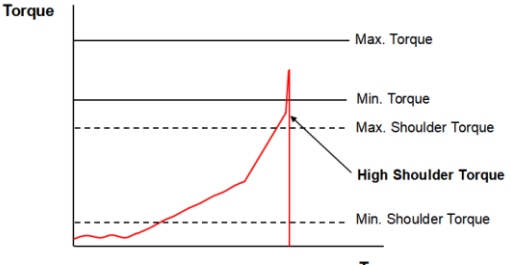
Possible reasons

- Misalignment between pin and box
- Threads not clean
- Wrong torque
- Not enough thread compound
- Torque cell not properly calibrated

Consequences

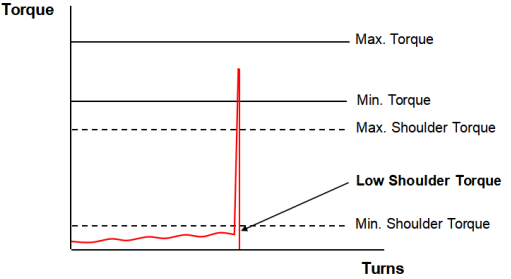
- Risk of leaking
- Risk of accidental unscrewing

The connection shall be broken out, cleaned, inspected,
and if it is not damaged, redoped and re-madeup.



Shoulder torque is outside the specified shoulder torque window.

Break out and evaluate.



Shoulder torque is outside the specified shoulder torque window.

Break out and evaluate.

There is low or high thread/seal interference.

Possible reasons

- Wrong torque
- Wrong thread compound

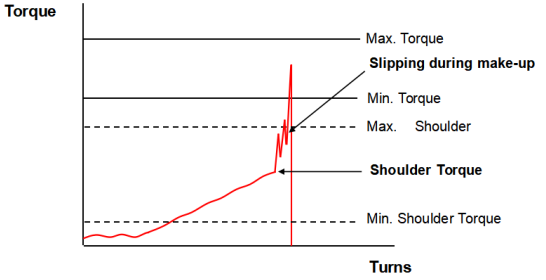
• Torque cell not properly calibrated

Consequences

• Risk of leaking

• Risk of accidental unscrewing

The connection shall be broken out, cleaned, inspected,
and if there is no damage, redoped and re-madeup



Rotation was interrupted during make-up.

Possible reasons

• Non-suitable dies on tong or backup

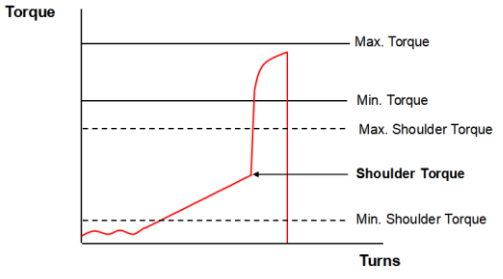
• Dirty or worn dies

• Hydraulic pressure in backup too low

Possible consequences

• Damage on pipe body

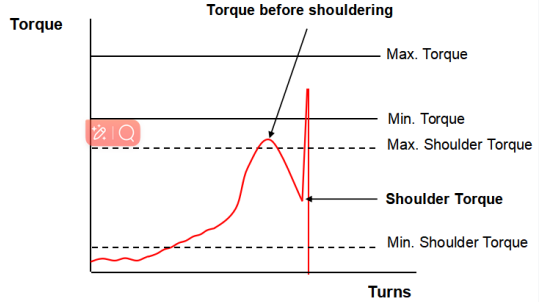
• Wrong diagrams even with correct make-up
The connection shall be broken out, cleaned, inspected, and
if there is no damage, redoped and re-madeup



Yielding or deformation of the torque shoulder.

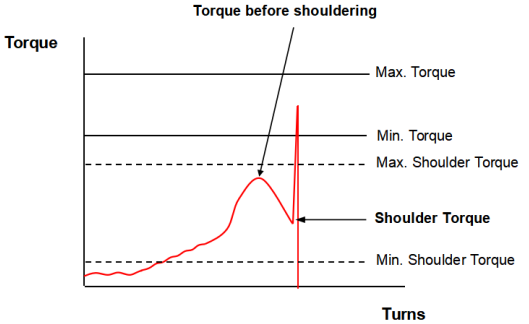
Connection shall be rejected and shall not be used

This may happen when the final torque exceeds the connection yield torque.
The connection shall be broken out and the pin and box connection shall be rejected and marked accordingly.



Abnormal make-up. Reject

Possible cause: excessive dope amount or dope contamination.
If the maximum hump torque is higher than the maximum shoulder torque, the connection shall be broken out, cleaned, inspected and if it is not damaged, redoped and remade-up.



Abnormal make-up. Accept.

3.7 Lowing the Pipe

- Lowing or lifting pipes with proper speed,avoid sudden movement, brake and crush.
- When filling mud,top box side should equipped with anti-splash hat,avoid mud pollute connection.

4 After running

4.1 Spare pipe storage

- Clean all remaining compound as soon as possible, apply the whole thread and sealing surface with appropriate storage grease, fit protector, and store according to the previous requirements;
- The rejected tubing and casing should be marked and stored separately for later maintenance;
- Non-standard storage will cause thread damage, and subsequent drilling will cause great security risks.

4.2 Pipe pulling out

- If the pipe need to be pulled out due to the well condition, the mud and other attachments on the surface of the pipe body and thread should be removed in time, and the protector should be fitted to avoid bumping, and the pipe should be stored according to the previous

requirements;

- It is suggested that before the pipe is put into the well again, the thread should be inspected one by one. If the thread is found damaged, the thread can be repaired with file, sandpaper and wet stone.
- Record the specifications, steel grade, thread type, heat number, batch number, pipe number, length, weight and other information of the tubing and casing that cannot be normally run into the well.

4.3 Special Notice

- Since the make-up and break out torque on the used landing joint is large, which is easily to link with the shackle of the hanging section of the pipe string(both field end and mill end) and result in jump out accidents. Therefore, it is recommended to use a brandnew landing joint, and at the same time, the cement

should fill to the wellhead to reduce length of the suspended section.

- Pipe does not have weldability due to its generally high carbon equivalent, so it is strictly prohibited to weld pipe when operating in well or installing accessories;
- When installing the wellhead for intermediate casing and production casing, it is strictly forbidden to transfer the load to the outer string through the wellhead device.

5 Handle exceptions

The make-up process is abnormal

During the running process, if the following abnormal conditions occur:

- The torque curve of the premium connection with shoulder has no shoulder point, and the shoulder point is too high or low;
- After make-up, the temperature at the

coupling rises and becomes hot;

- The pressure test is not passed after make-up;
- Other abnormal situations.

The operator should stop running immediately and check whether there is any thread damage such as thread crossing or galling.

If thread crossing or galling and other thread damage happened, repaired the thread, re-apply dope for remake-up, and can increase the make-up torque to maximum torque, if the abnormal situation still exists, then the joint should be rejected.

Note: The abnormal make-up can not guarantee the connection strength, may cause serious accidents, such as leakage, fall down etc. So it is strictly prohibited unaccepted make-up pipes run in hole.

6 Field Visual Inspection and Repair of Premium Connection

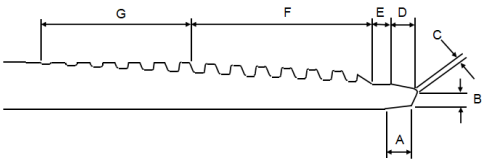
6.1 Applicable range

This procedure is applicable for all CITIC TPCO premium connection's visual inspection, including unused or break out connection at customer's pipe yard and rig site, and allowed repair method base on above inspection.

6.2 Anti-galling coating protection

For all anti-galling surface treatment, including Phosphating, Copper-planting, dopeless coating, sand-blasting on pin or box side, the repair process should avoid bring any extra wear or damage to the coating as far as possible.

6.3 Pin end Visual Inspection Criteria



Area	Description
A	**Pin bored ID**
B	**Torque shoulder**
C	**Conjunction radii between torque shoulder and main seal**
D	**Main seal**
E	**Conjunction portion between main seal and thread**
F	**Perfect thread length**
G	**Black crested thread**

Area	Corrosion	Rust	Pitting	Scratches	Friction Marks	Galling	Indentation to be filed off
A	Repair2	Repair2	Repair2	Accept	N/A	N/A	Repair2
B	Repair2	Repair2	Repair2	Repair2	Repair2	Repair3	Repair3
C	Repair2	Repair2	Repair2	Repair2	Repair2	Repair3	Repair3
D	Reject	Repair1	Reject	Reject	Repair1	Reject	Reject
E	Repair2	Repair2	Accept	Repair2	Repair2	N/A	Repair2
F	Repair2	Repair2	Repair2	Repair2	Repair2	Repair3	Repair3
G	Repair3	Repair3	Accept	Accept	Accept	Repair3	Repair3

Definition:

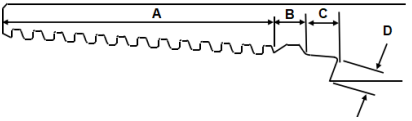
N/A: Not Applicable

Repair1: Try refurbish using Scotch-Brite, if all abnormal defects and signs disappeared from visual angle, then accepted

Repair2: Try refurbish using 400# emery cloth or Scotch-Brite, if all abnormal defects and signs disappeared from visual angle, then accepted。

Repair3: Try filed out defects with fine files first, then refurbish with 400# emery cloth or Scotch-Brite, if all abnormal defects and signs disappeared from visual angle, then accepted.

6.4 Box end Visual Inspection Criteria



Area	Description
A	Thread length
B	Dope pocket or cylindrical part
C	Main Seal
D	Torque shoulder

Area	Corrosion	Rust	Pitting	Scratches	Friction Marks	Galling	Indentation
A	Repair2	Repair2	Repair2	Accept	Accept	Repair2	Reject
B	Repair2	Repair2	Repair2	Accept	Accept	N/A	Reject
C	Reject	Reject	Reject	Reject	Accept	Reject	Reject
D	Repair2	Accept	Repair2	Repair2	Accept	Repair2	Reject

Definition:

N/A:Not Applicable

Repair2: Try refurbish using 400# emery cloth or Scotch-Brite, if all abnormal defects and signs disappeared from visual angle, then accepted。

Repair3: Try filed out defects with fine files first, then refurbish with 400# emery cloth or Scotch-Brite, if all abnormal defects and signs disappeared from visual angle, then accepted.