

BEYOND THE SELF PURSUIT OF EXCELLENCE



天津德华石油装备制造有限公司

Running Procedure of TTGM-3



①

Purpose

This training proposes the recommended procedure of proper running and handling pipes with TTGM-3 premium connection. 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

Reference

API RP 5C1, API SPEC 5CT, TTGM
INTERNAL STANDARD



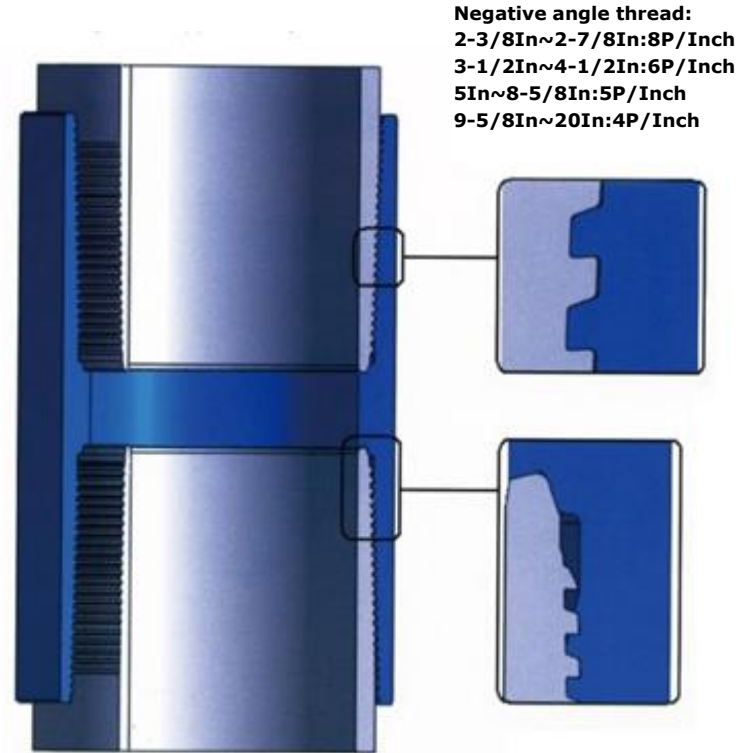
③

Identification of products

- 1. Introduction of TTGM-3**
- 2. Pipe marking and identification**
- 3. Joints applicable**

Summary introduction

TTGM-3 is a T&C connection ideal for tubing and production casing strings applications. It provides gas-tight sealing under the most severe conditions including great depths, highly deviated holes, and hostile environments. It outperforms the majority of today's premium connections designed according to casing and tubing requirements.



①

**Excellent
gas-tight
sealing
under
combined
loads**

②

**Excellent
resistance to
bending,
compression
and torque**

③

**Excellent
resistance to
external
pressure
and
compression**

④

**Easy to use
and repair**

①

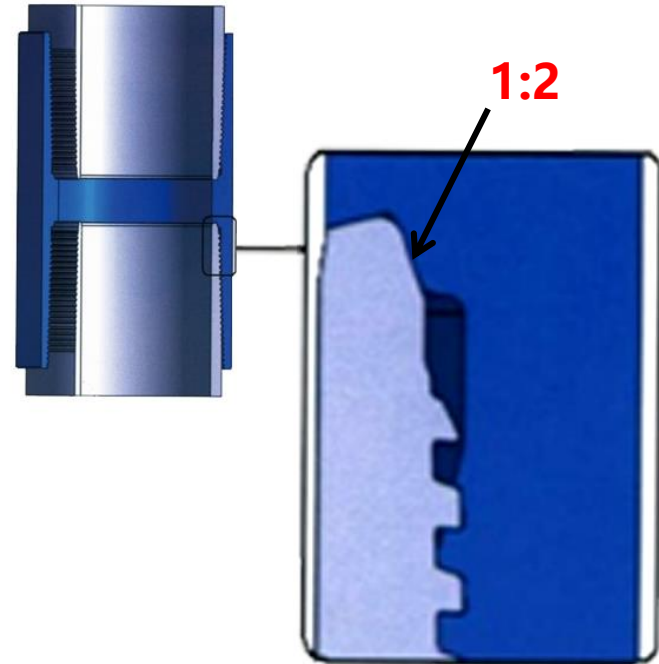
A patented 1:2 metal-to-metal seal system offers excellent gas tight sealing even under the most severe combined loads, as encountered in deviated or long horizontal wells applications.

②

Sealing integrity remains constant despite repeated make-up and break-out.

③

Seal geometry protects against galling.



①

A reverse angle torque shoulder provides a positive torque stop which allows for accurate power tight make-up and minimizes hoop stresses in the connection.

②

The wedge effect caused by the reverse angle gives the connection superior structural strength.

③

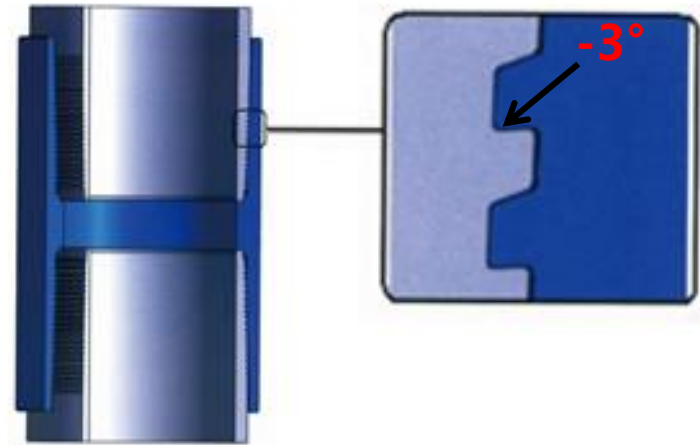
The shoulder design is optimized in order to resist adverse conditions such as combined compression and external pressure or combined bending, compression and torque.

①

A modified hook thread profile not only provides the connection with superior tension strength but also increases its resistance to compression.

②

The excellent structural strength makes the connection especially suited for highly deviated and long horizontal wells.



③

Optimized thread geometry minimizes the risk of galling even when thread lubricants are poorly applied.

Coupling Design

Coverage of the vanishing threads, long internal shoulder, and coupling critical cross sections greater than those of the pipe body, contribute to a high performance, 100% efficient connection.

Streamlined Internal profile

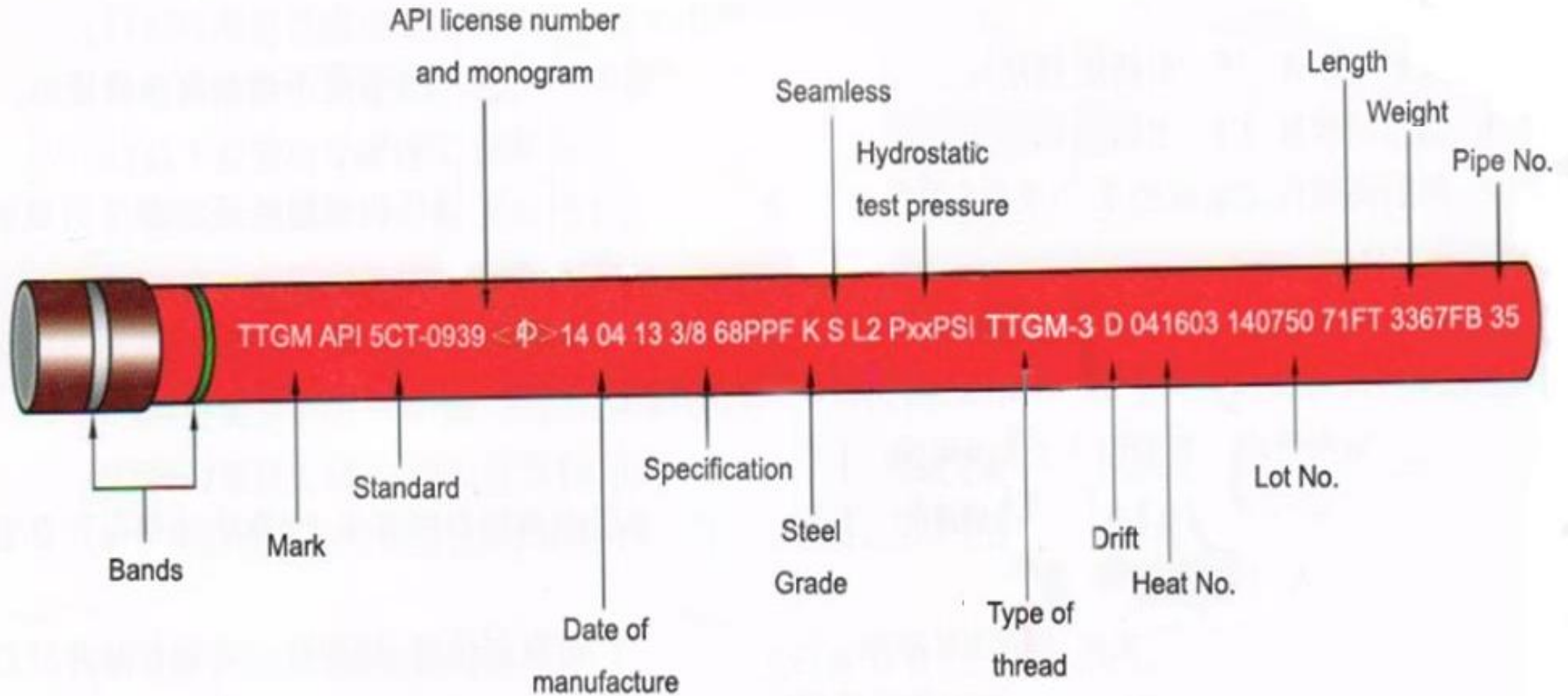
A pin ID chamfer, tight tolerances on the coupling center and a long shoulder combine to minimize turbulence and energy loss inside the connection for high velocity gas flows.

Joins applicable















Joint Type	TTGM-3
OD specification	2-3/8" ~ 20"
Material	Carbon steel and low-alloy steel
Steel grade	API grade
Stabbing Flank Angle	50% taper
Loading Flank Angle	-3°
Taper of Thread	6.25% on the diameter
Anti-galling treatment	Phosphating or copper-plating of the coupling

Note: The technical data and recommended torque values are listed in [TTGM-3 Data.pdf](#) and [TTGM-3 Torque.pdf](#)









Product Identification













Product Identification-API

Steel Grade	Colour Code	Coupling	Pipe Body	Steel Grade	Colour Code	Coupling	Pipe Body
J55		Entire bright green with one white band	One bright green	L80-9 Cr		Two yellow	One red, one brown, two yellow
K55		Entire bright green	Two bright green	L80-1 3Cr		One yellow	One red, one brown, one yellow
M65		Entire red with one brown band	One bright green, one blue	C90		Entire purple	One purple
N80-1		Entire red	One red	T95		Entire silver	One silver
N80-Q		Entire red with one green band	One red, one bright green	C110		Entire white, two brown	One white, two brown
R95		Entire brown	One brown	P110		Entire white	One white
L80-1		Entire red with one brown band	One red, one brown	Q125		Entire orange	One orange







Product Identification-TTGM

	Steel Grade	Colour Code	Coupling	Pipe Body
TT Series H ₂ S Anti- Corrosion Oil Well Pipe	TT80S		Entire red with one yellow band	One red, one yellow
	TT80SS		Entire red with one yellow band	One red, two yellow
	TT90S		Entire purple with one yellow band	One purple, one yellow
	TT90SS		Entire purple with one yellow band	One purple, two yellow
	TT95S		Entire silver with one yellow band	One silver, one yellow
	TT95SS		Entire silver with two yellow band	One silver, two yellow
	TT110S		Entire white with one yellow band	One white, one yellow
	TT110SS		Entire white with one yellow band	One white, two yellow









Product Identification-TTGM

	Steel Grade	Colour Code	Coupling	Pipe Body		Steel Grade	Colour Code	Coupling	Pipe Body
TT Series CO ₂ Anti- Corrosion Oil Well Pipe	TT80-1Cr		Entire red with one gray band	One red, one gray	TT Series CO ₂ Anti- Corrosion Oil Well Pipe	TT95-1Cr		Entire silver with one gray band	One silver, one gray
	TT80-3Cr		Entire red with yellow and gray band	One red, one gray and one yellow		TT95-3Cr		Entire silver with yellow and gray band	One silver, one gray, one yellow
	TT80-5Cr		Entire red with gray and green band	One red, one gray and one green		TT95-5Cr		Entire silver with gray and green band	One silver, one gray, one green
	TT80-9Cr		Entire red with gray and brown band	One red, one gray and one brown		TT95-9Cr		Entire silver with gray and brown band	One silver, one gray, one brown
	TT80-13Cr		Entire red with two gray band	One red, two gray		TT95-13Cr		Entire silver with two gray band	One silver, two gray

Product Identification-TTGM

	Steel Grade	Colour Code	Coupling	Pipe Body
TT Series CO ₂ Anti-Corrosion Oil Well Pipe	TT110-1Cr		Entire white with one gray band	One white, one gray
	TT110-3Cr		Entire white with yellow and gray band	One white, one gray, one yellow
	TT110-5Cr		Entire white with gray and green band	One white, one gray, one green
	TT110-9Cr		Entire white with gray and brown band	One white, one gray, one brown
	TT110-13Cr		Entire white with gray and blue band	One white, one gray, one blue
	TT110-SUP13Cr		Entire white with two gray	One white, two gray

Product Identification-TTGM

	Steel Grade	Colour Code	Coupling	Pipe Body
TT Series Collapsing Resistance Casing	TT80T		Entire red with one green band	One red, two green
	TT95TT		Entire brown	One brown, two green
	TT110TT		Entire white	One white, two green
	TT125T		Entire orange	One orange, two green
	TT140T		Entire pink	One pink, two green
TT series Heavy Oil Thermal Production Pipe	TT90H		Entire blue	One brown, one blue
	TT100H		Entire white	Two white, one blue
	TT110H		Entire white with one blue band	One white, one blue

④

Preparation before Running

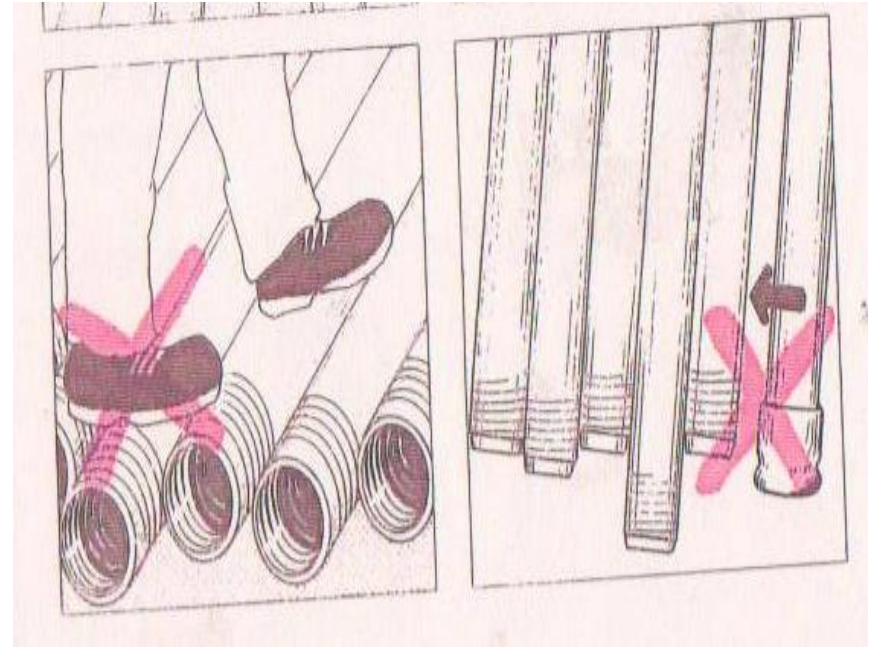
1. Storage

2. Preparation
and Equipment
before Running



Storage

All connections should be protected by thread protectors at all times. The pipes should be placed on racks free of stone, sand or sludge. In case the pipe or connection is pulled into sludge or dirt, the contaminated area should be cleaned.



First check all accessories, such as crossover, pup joint, float shoe, hanger, packer etc. As these accessories come from different manufacturers, the threads of the accessories should be carefully examined to ensure that they were threaded with the correct connection.

Preparation and Equipment before Running

Preparation and Equipment before Running

- Elevators

Slip type elevators are recommended for longer, heavier strings. The dies and slips should remain clean and free of damage.

Prior to running, the diameter, setting angle and the slips length should be checked to ensure they are fit for the OD and weight of the pipes.

Note:

1. Make sure the slips and elevators will not extruding the pipe body, they should be positioning on box joint instead of couplings.
2. For security, use **single joint flange hanger** is better than chain or rope to lift the pipes from racks and cross the V door.
3. In order to avoid pipe damage, long and wide inserts of slips is recommended.

If collar type elevators are applied, carefully check its bearing surface:



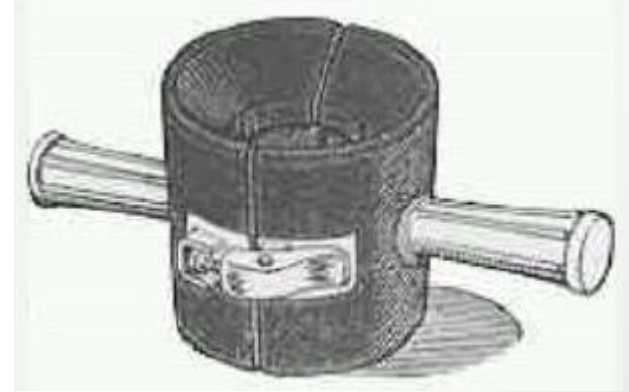
check for signs of any uneven abrasion or wear since this may cause the coupling to rise at one side and its eventual failure.



Check if the load is evenly distributed when the load is applied onto the bearing surface.

Stabbing Guide

It is recommended to use a stabbing guide which assists when the pin end is lowered into the coupling end of the casing pipe. Before running the pipe make sure of a correct match between the stabbing guide inside diameter and the pipe outside diameter, and check condition of the rubber block.



Stabbing Guide

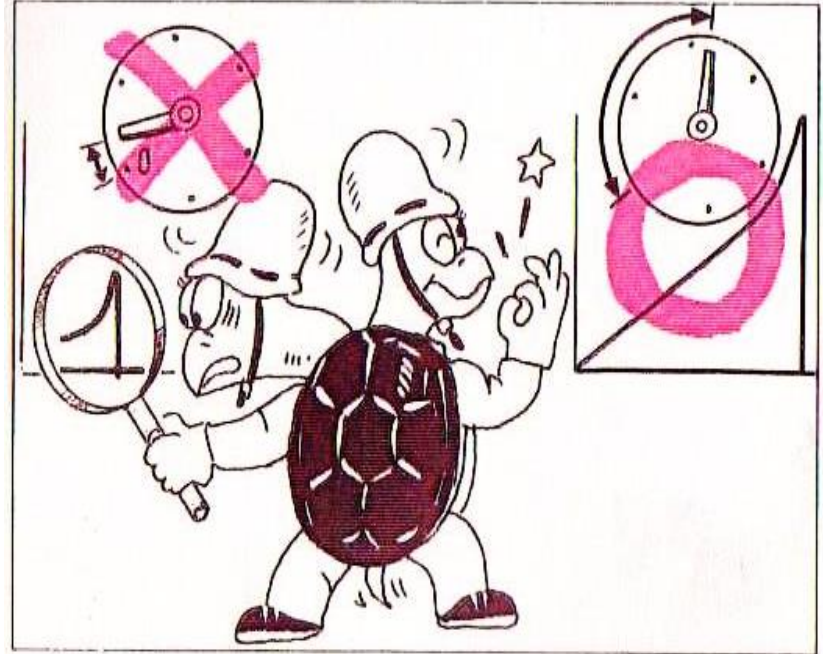


**A good
stabbing
guide
must be:**

- Fitted with plastic or rubber guides,
- In good condition.
- Not too heavy
- With a good closing system
- Of the correct diameter and must totally cover the box face.

Power Tong

The power tong should be in a proper and safe working condition and selected reasonable.

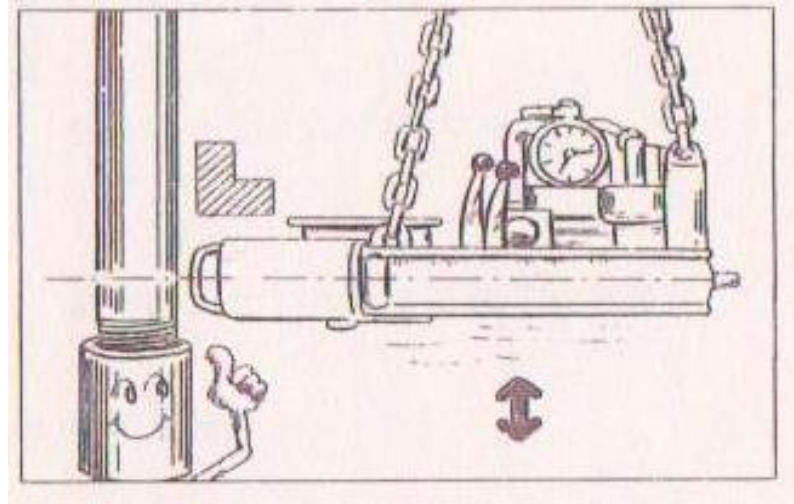


Power Tong

The tong jaws should fit the outside diameter of the pipe. An integral tong i.e. one with a backup tong is recommended. 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.

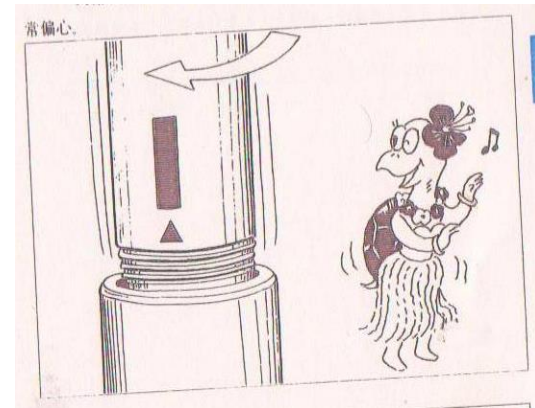
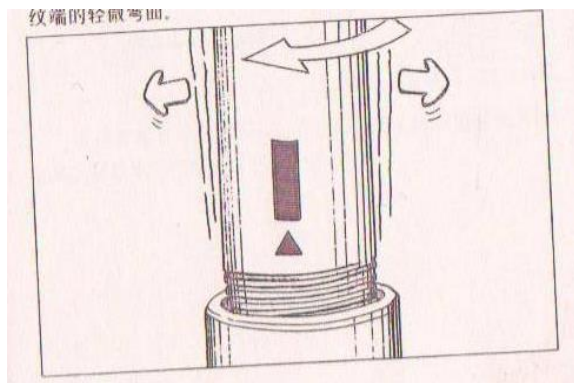
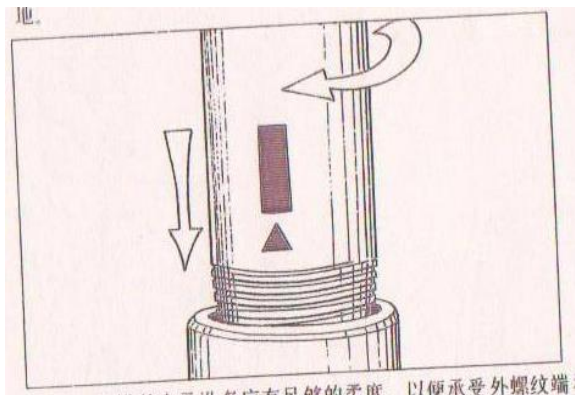
Power Tong

The pipes have vertical movement during make up and break out process, so the power tong must can vertical move with pipes to avoid unexpected stress bear on threads.



Power Tong

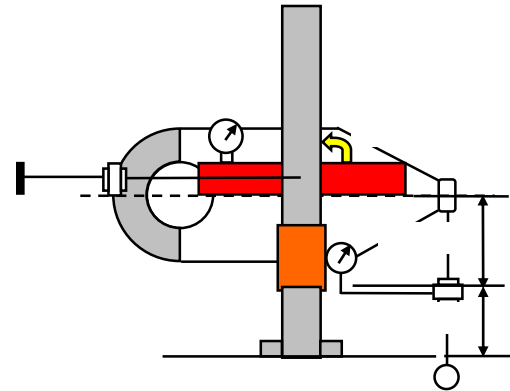
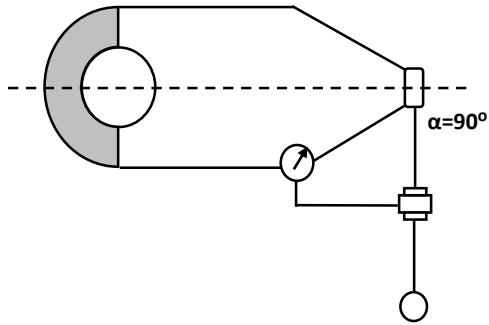
When using tongs with integral back-up, free motion should be possible between tong and back-up. There must have sufficient travel in the back-up to absorb the make-up loss, good flexibility in the tong/back-up to admit a slightly bent pin or box end and can absorb any eccentricity between pin and box.



Power Tong

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.

Configuration of the tong and the load cell



Angle of the snub line and torque correction factor

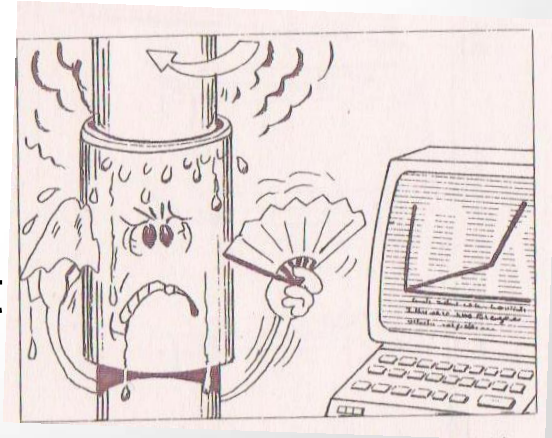
α (°)	90	85/95	80/100	75/105	70/110	65/115	60/120	55/125
Correction factor	1.00	0.99	0.98	0.97	0.94	0.92	0.87	0.82

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

Make up monitor system

A monitor system or a recorder which can record the torque, rotation turns and curves can be used to ensure make-up process. The accuracy of rotation turns measurement should upper than 0.01 turns.

Note: The electric equipment can provide important information to people from the torque sensor and laps sensor. The monitor system is just a make-up auxiliary equipment system, it can't replace good operator.



Preparation of Mouse Hole

When running the pipe and if it is necessary to store the pipe inside the mouse hole, the hole should be cleaned up. Alternatively, it can be replaced by another clean one. There should be no sludge or sand inside the hole.

⑤

Before Running the Pipe

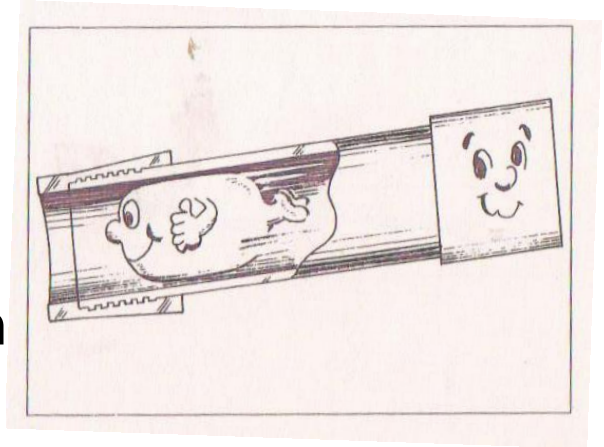
1. Drift
2. Measurement of the Pipe Length (Fig.1, Table 3)
3. Cleaning
4. Visual Check of Threads before Running
5. Lifting the Pipe from Pipe Rack

Drift

Before running the pipe, each pipe shall be full length drifted. Drift bar OD shall satisfy with API standard or requirement. Before drifting, inner surface of the pipe shall be clean and free of any contamination

◆ **The lighter the drift bar is the better.**

A plastic covering on drift is recommended to apply on high alloy steel. Be very careful when putting the drift bar into and out of the pipe. Drifting shall be conducted from the box end to pin end so as to avoid any damage to the thread, sealing face and shoulder.



Dimensions of Standard Drift Mandrel

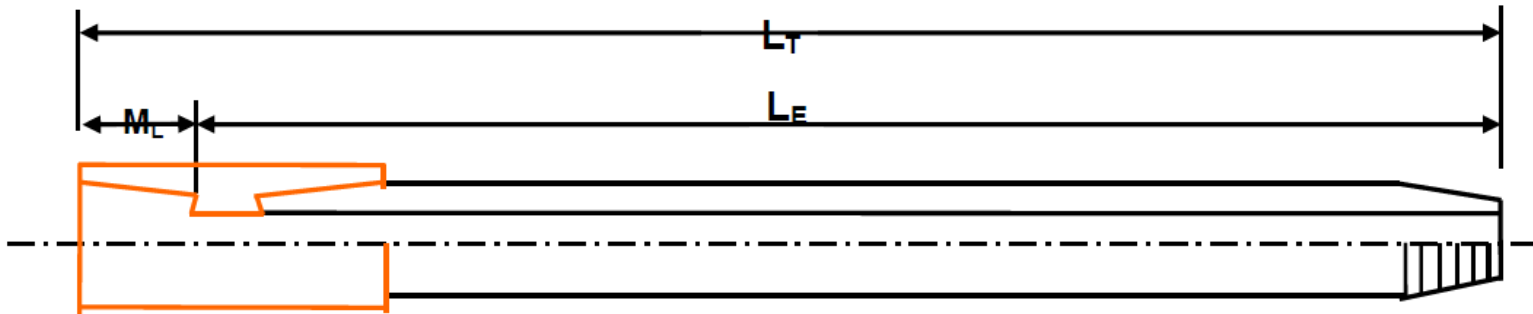
Product	OD	Min. Drift Mandrel Length		Min. Drift Mandrel Diameter	
		in	mm	In	mm
Casing	<9-5/8 in	6	152	d-1/8	d-3.18
	9-5/8 ~ 13-3/8 in	12	305	d-5/32	d-3.97
	>13-3/8 in	12	305	d-3/16	d-4.76
Tubing	≤2-7/8	42	1,067	d-3/32	6-2.38
	>2-7/8	42	1,067	d-1/8	d-3.18

Special drift can be conducted if requested by customers.

Measurement of the Pipe Length (Fig.1, Table 3)

Length of each pipe shall be measured before running, from the coupling face to the nose of the pin end by using steel tape measure. (The make-up loss of TTGM-3 is listed in [TTGM-3 Torque.pdf](#))


**Effective length of each pipe (LE) =
Full length (LT) - Makeup loss length (ML)**




Cleaning

Ensure that there is no contamination on the thread and sealing surface before makeup.

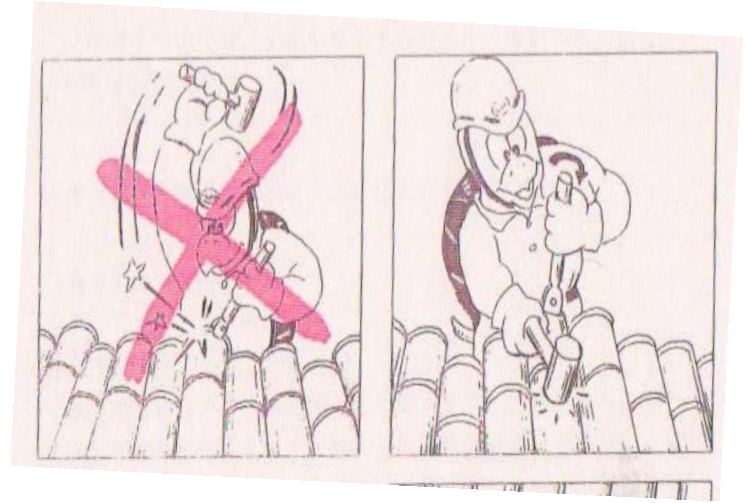
Remove the thread protector at two end.

 If the protector is loose or dirty, the thread should be checked to avoid dirty and damage.

 If the protector can't remove easily, use a hammer knocking on the pipe lightly is allowed, it will not broke the thread.

Clean out the thread compound or storage grease in appropriate ways, such as by using the non-metal brush and steam or quick-dry solvent (excluding chlorine).

Check and clean the inside of the pipe to prevent impurity such as scale or grit falling onto the coupling during lowering and makeup of the pipe. When compressed air is available, blows the pipe internal surface from box end to pin end. Wash and wipe the thread protector dry. Ensure cleaning will not pollute the environment.



Visual Check threads and sealing surface before Running

Before running visually inspect all threads and sealing surface when on the pipe rack. The surface should smooth without contaminant, the slight defect and rust can be grinded, In case of any damage or severe defect found, the pipe shall be removed.

Lifting the Pipe from Pipe Rack

When the pipe is lifted up into the derrick, thread protector shall remain on the pipe all the time. Each pipe should be carefully lowered or rolled from the pipe rack. Rough handling is strictly prohibited. Action should be taken to avoid the pipe hitting the V door or any part of other equipment. The buffer rope should be prepared at V door.

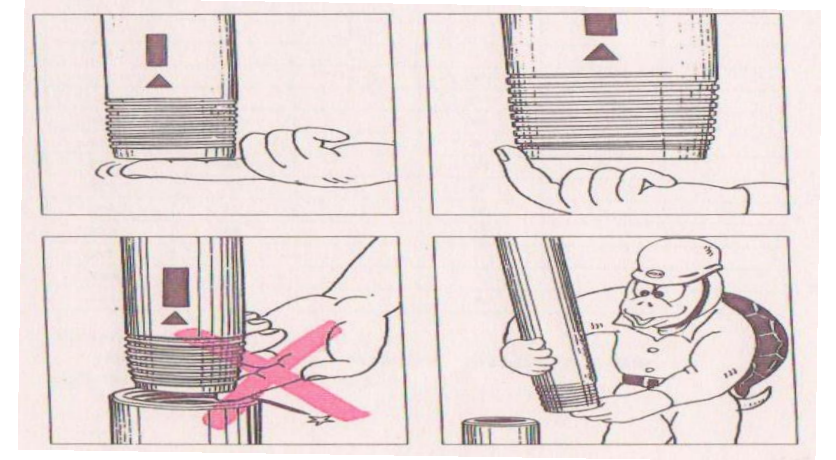
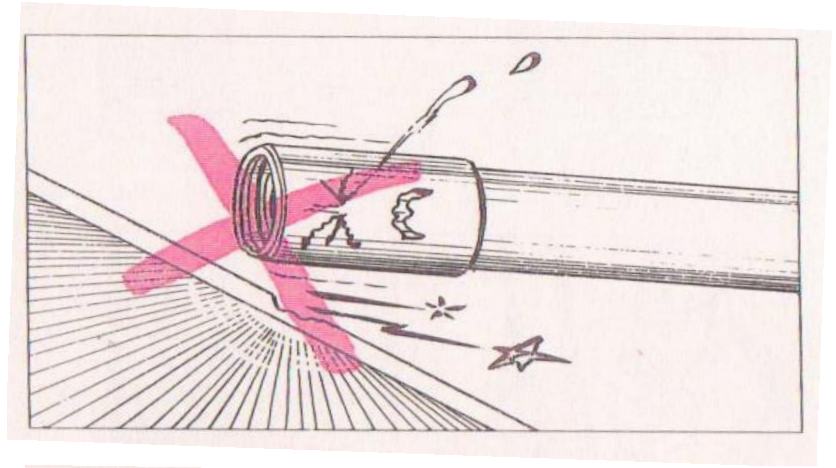
⑥

Running the Pipe

- 1. Operation Prior To Make-up**
- 2. Apply the Thread Compound**
- 3. Stabbing and Thread Engagement and Tightening**

Operation Prior To Make-up

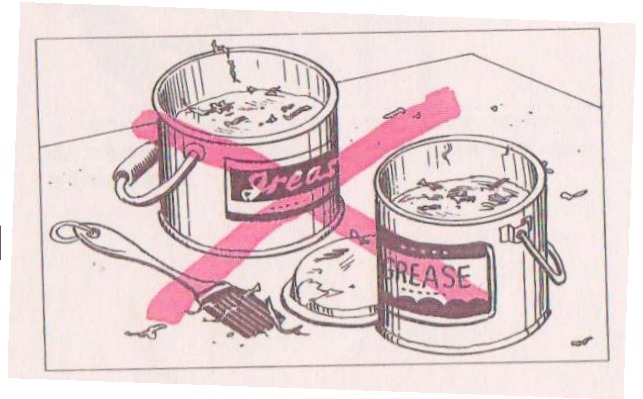
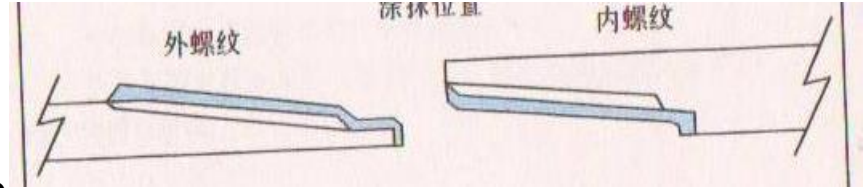
Please don't remove the protector during moving the pipe to ensure no damage to thread and coupling. Lift the pipe to the vertical position, remove the thread protector, and clean the threads with compressed air or the chlorine-free solvent. Check the thread, sealing surface and shoulder, ensure no damage and cleaned up.



Apply the Thread Compound

Apply a thin even coat of thread compound on all surfaces of external and internal threads and the sealing face within a short period just before makeup of the connection.

The profile of the thread should still be visible after application of the compound. The compound and the brush or device for applying the compound should be clean and free of any contamination. The thread compound must not be diluted. It is recommended to use the improved high-temperature high-pressure thread compound specified in the latest version of API Bul 5A3 Bulletin, or the special thread compound specified by the customer which provides adhesive, solidified and sealing functions, or environmental considerations.

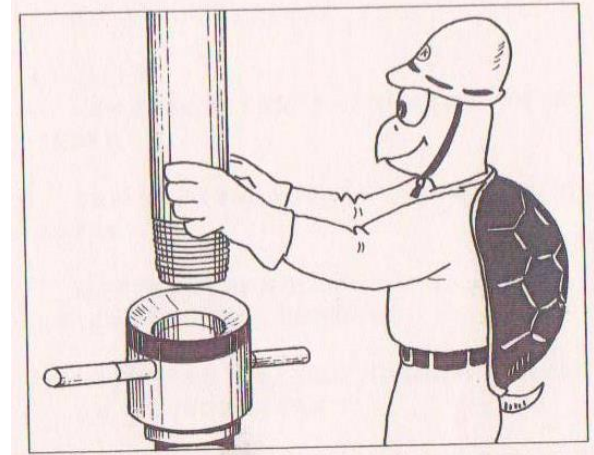
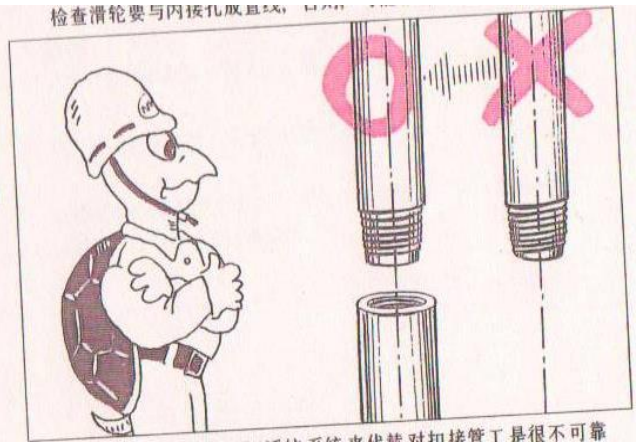


Minimum make-up dope quantity

Nominal OD		PIN and BOX (g)
mm	in	
60.3	2 3/8	9
73.0	2 7/8	11
88.9	3 1/2	13
101.6	4	14
114.3	4 1/2	16
127	5	30
139.7	5 1/2	35
168.3	6 5/8	40
177.8	7	45
193.7	7 5/8	45
219.1	8 5/8	50
244.5	9 5/8	60
273.1	10 3/4	60
298.5	11 3/4	70
339.7	13 3/8	80

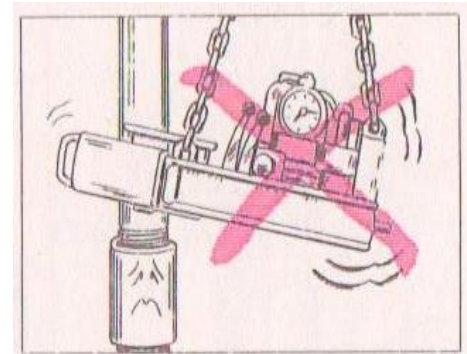
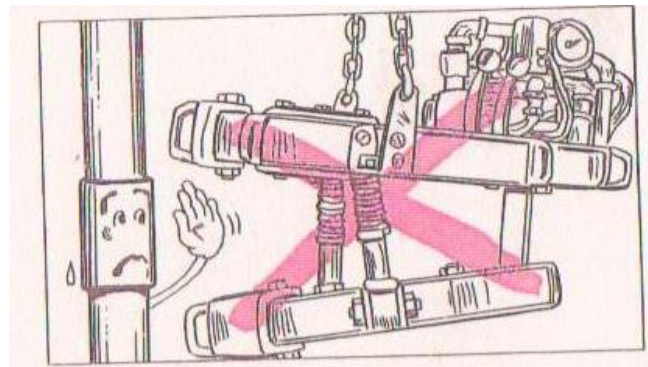
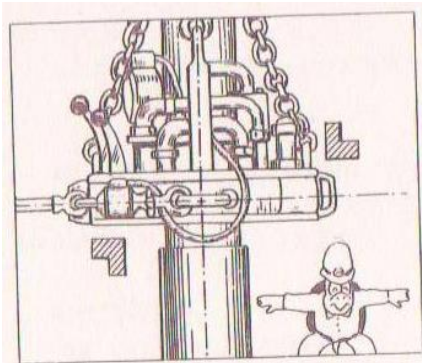
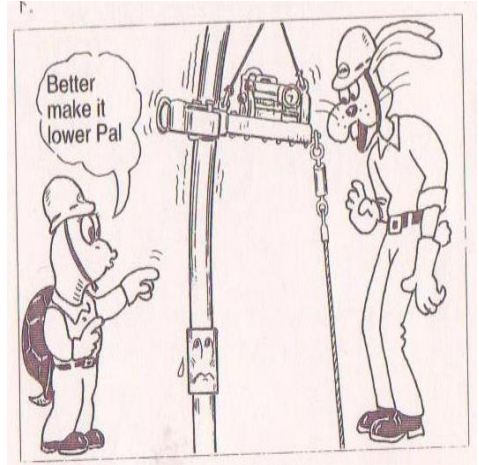
Stabbing and Thread Engagement and Tightening

During stabbing, lower the pipe with care and avoid damage to the threads and the sealing surface. It is recommended to use a stabbing guide to help stabbing the pin into the box in a smoothly as possible. Stabbing shall be done vertically and it is better to assist the operation by hand on the stabbing board.



Stabbing and Thread Engagement and Tightening

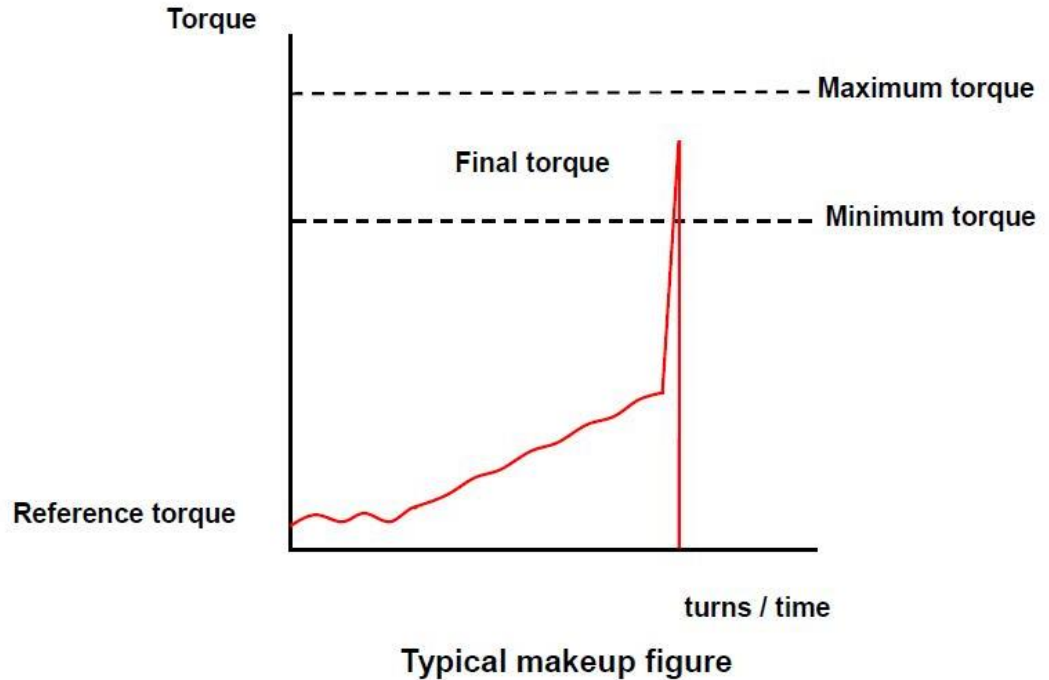
If the pipe inclines toward one side after stabbing, lift up and check the pipe. After stabbing, first use **belt tong** or slowly rotate the pipe by the power tong with **low speed/high gear**, making sure that the threads are properly engaged and no cross threading. Check the equipment condition, e.g., the power tong is at right position, the tongs keep horizontal, parallelism between back up and tong, all slip sections can move smoothly.



Stabbing and Thread Engagement and Tightening

The makeup torque should correspond to the torque range recommended by the manufacturer.

The typical makeup figure of the premium-connection pipes is shown as follows.



Make-up speed requirement

Material	Starting Period		Final
	First 2-3 turns	After 2-3 turns	Power tight
Carbon steel and low-alloy steel	Better by hand or low speed gear	High gear Maximum 15 rpm	Low gear Maximum 5 rpm
High-alloy steel	Hand-tightened to the ultimate degree		Low gear Maximum 3 rpm

⑦

Reject Criteria / Disposition



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 remade up. Connections shall not be made up more than 3 times. Connections that do not produce an acceptable graph within 3 make-ups, shall be rejected and shall not be used.


Reject Criteria / Disposition

Connections can be reused, if follows does not occur:

 No galling on the thread of the connection.

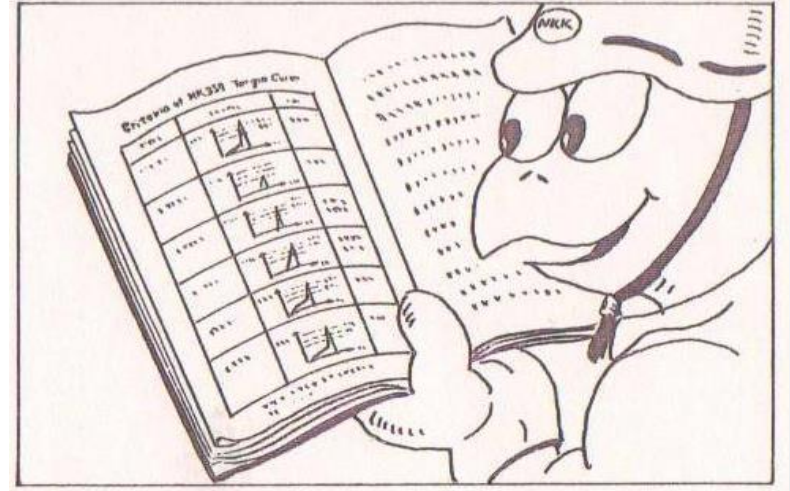
 No galling on the seal of the connection.

 No shedding of the plating on the seal

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

Make up acceptance

The make-up is qualified when torque value meet standard and no obviously marks subjected by tong, slips and elevator. During pipe running, each shift should arrange one person to check the make up result.

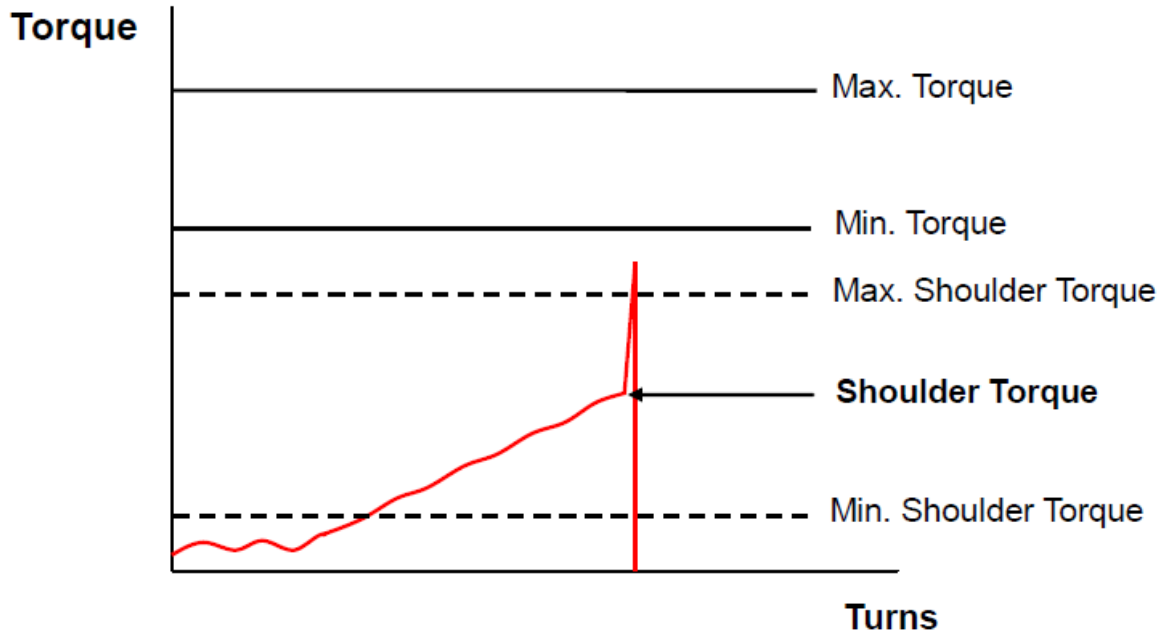


Note: Please find out the reasons when an unqualified make up was shown on the torque curves, in order to avoid repetition.

Accept and Reject Criteria

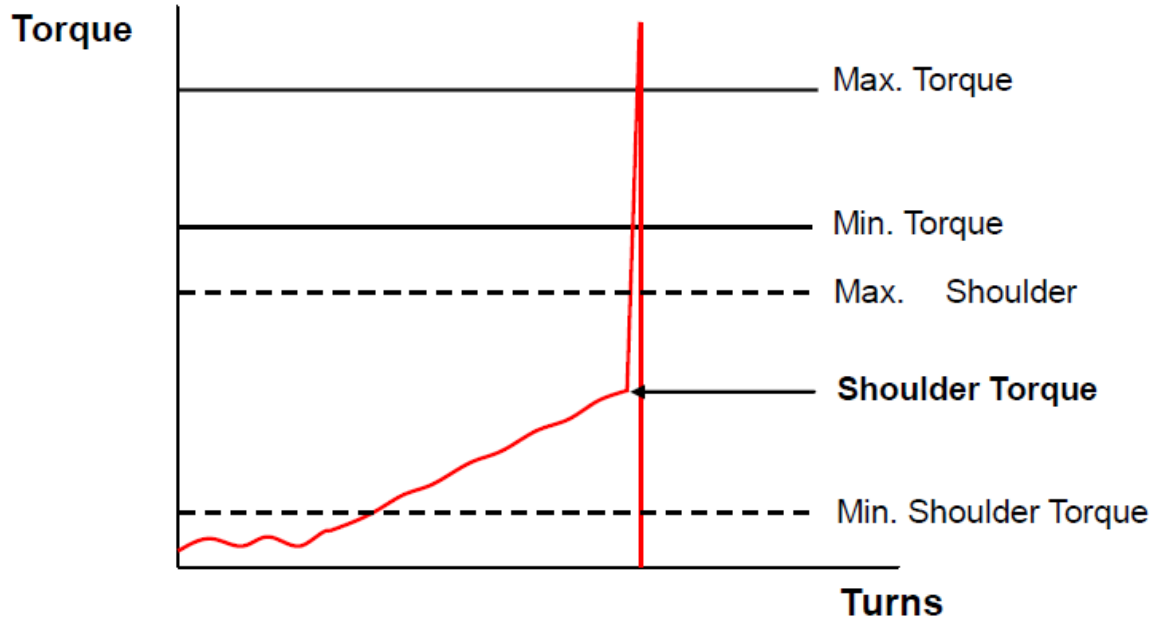
Case 1: Minimum specified torque is not obtained

Disposition Procedure: Break out and evaluate.



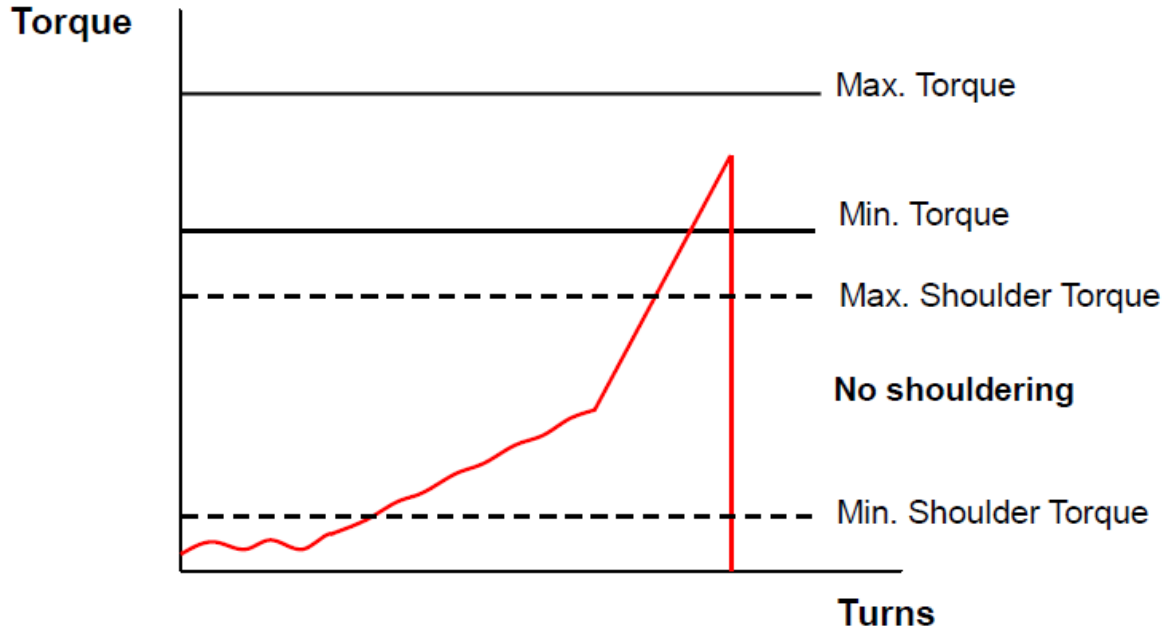
Accept and Reject Criteria

Case 2: Maximum specified torque is exceeded
Disposition Procedure: Break out and evaluate.



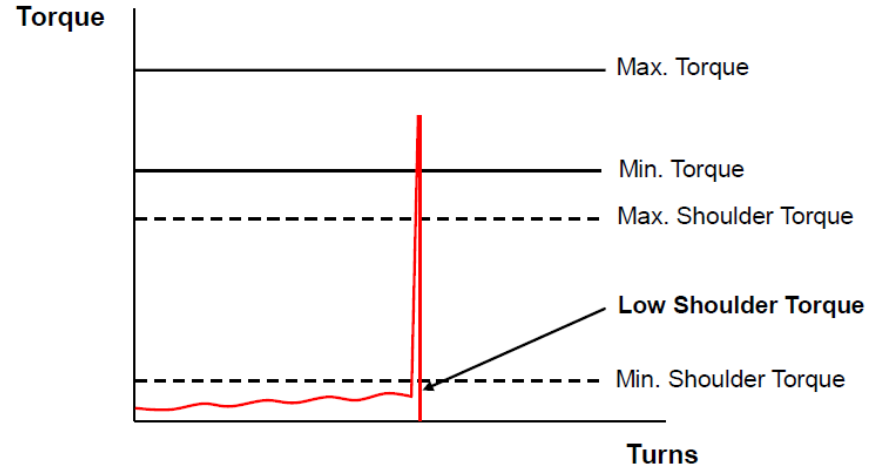
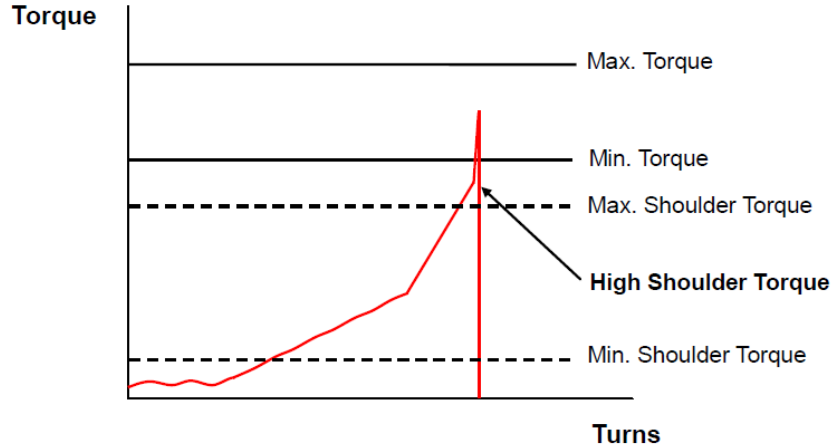
Accept and Reject Criteria

Case 3: Torque shoulder does not engage
Disposition Procedure: Break out and evaluate.



Accept and Reject Criteria

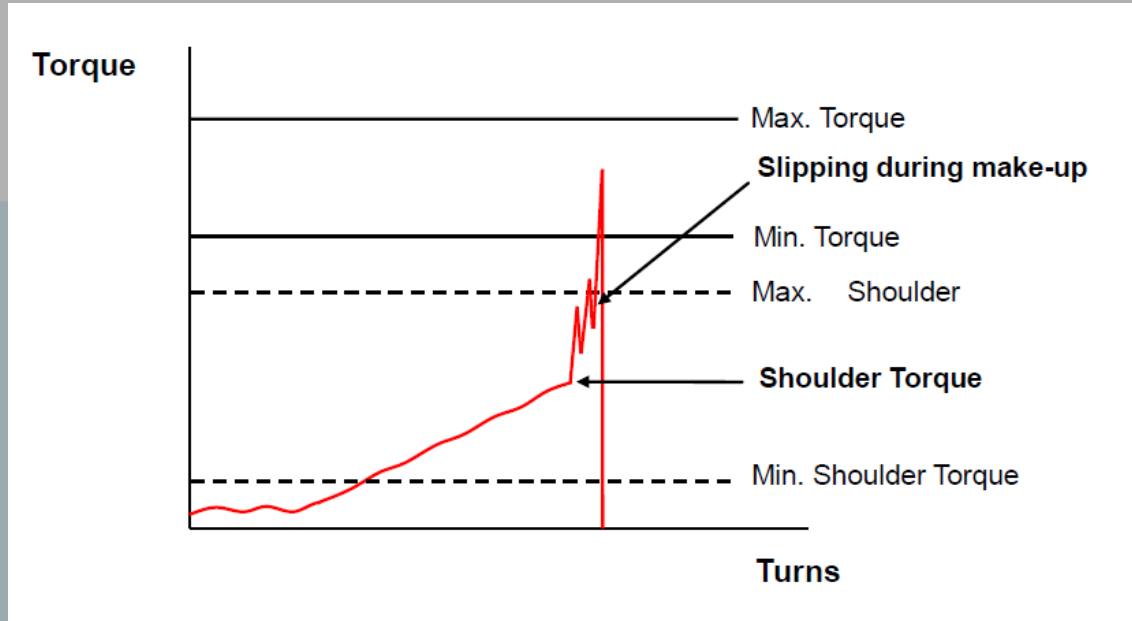
Case 4: Shoulder torque is outside the specified shoulder torque window
Disposition Procedure: Break out and evaluate.



Accept and Reject Criteria

Case 5: Slipping during make-up

Disposition Procedure:
If the tong mark less than the requirement specified in table 4, the make-up is accept. If the tong mark greater than the requirement specified table 4, remove the tong mark by grinding.



Accept and Reject Criteria

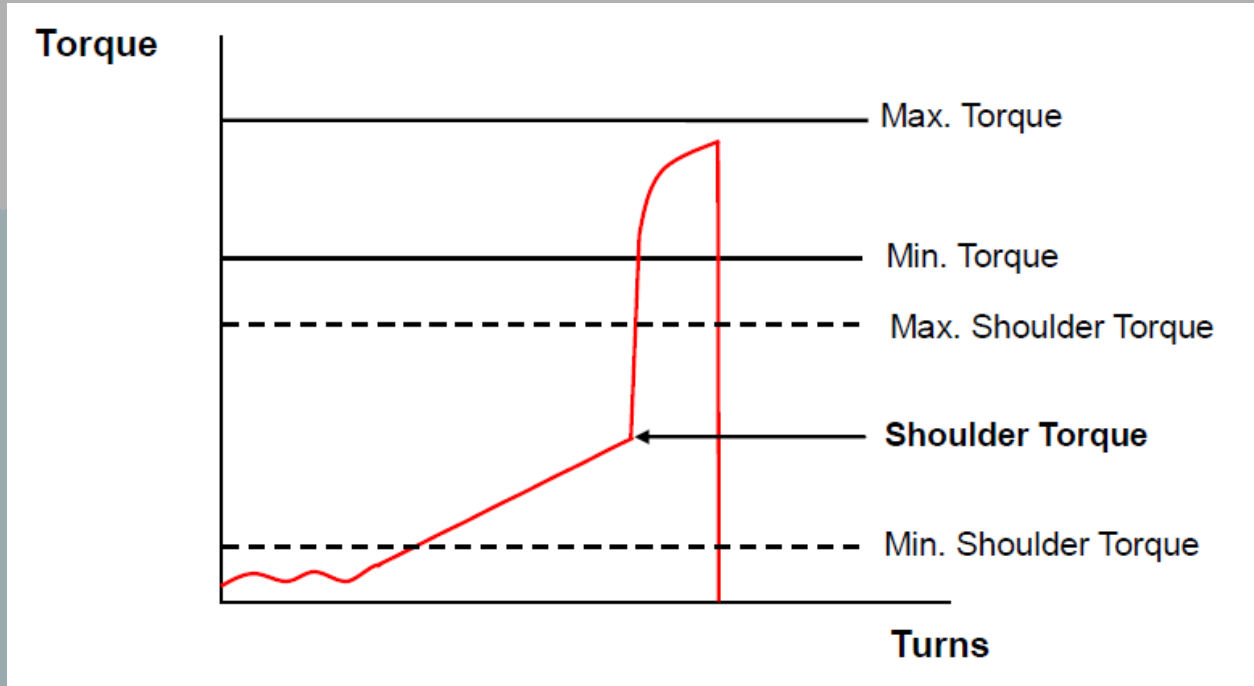
Tong mark limit

Product	OD	Group 1 + Group 2 (ex.C90&T95) +Group 3		Group 2 (C90&T95) +Group 4	
		Tong Mark		Tong Mark	
		In	mm	in	mm
Tubing	$<3-1/2$	0.030	0.76	0.030	0.76
	$3-1/2 \leq OD \leq 4-1/2$	0.045	1.14	0.035	0.89
Casing	$<6-5/8$	0.035	0.89	0.030	0.76
	$6-5/8 \leq OD \leq 7-5/8$	0.045	1.14	0.035	0.89
	$>7-5/8$	0.060	1.52	0.035	0.89

Accept and Reject Criteria

Case 6: Yielding or deformation of the torque shoulder

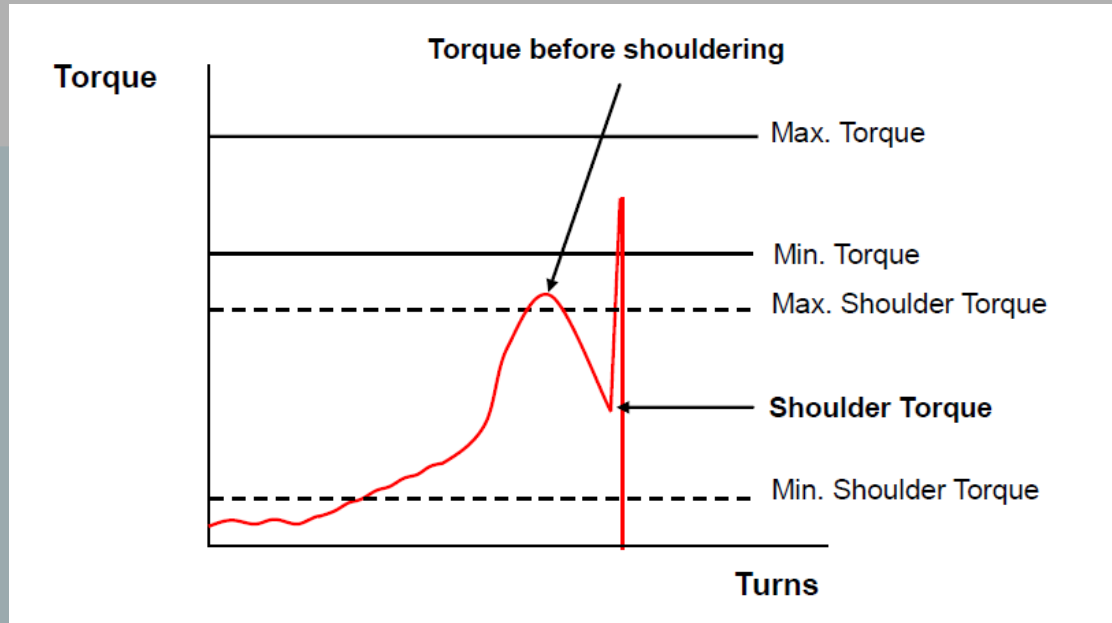
Disposition Procedure: Connection shall be rejected and shall not be used.



Accept and Reject Criteria

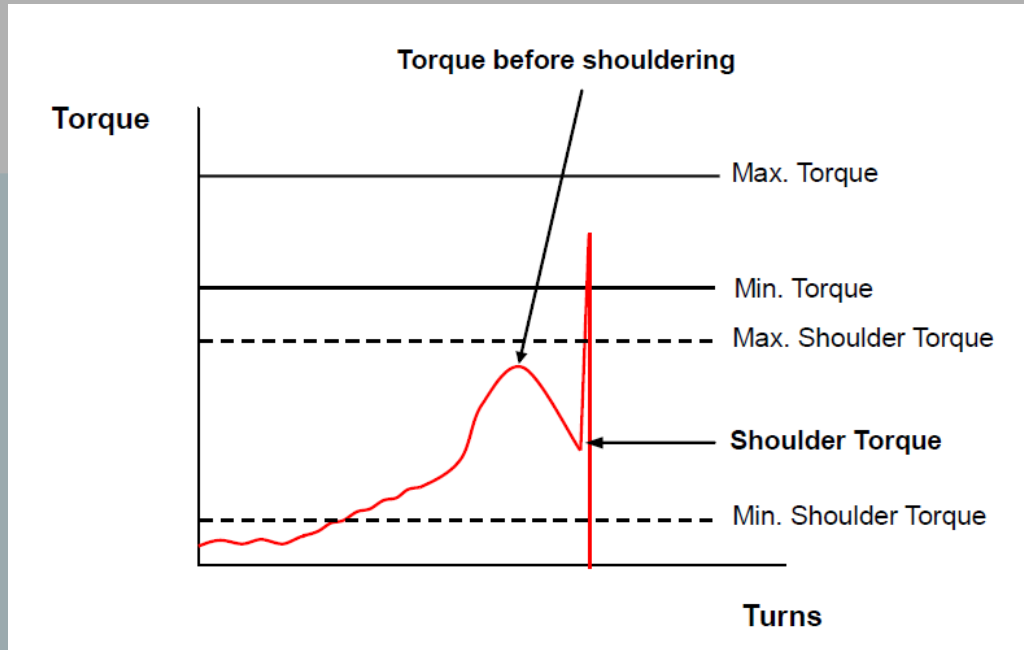
Case 7: Abnormal Make-up

- a) Torque before shouldering exceeds the max. shoulder torque
Disposition Procedure: Reject. Break out and evaluate.



Accept and Reject Criteria

b) Torque before shouldering smaller than the max. shoulder torque
Disposition Procedure: Accept.





⑧

Lowering the Pipe

Lower or lift the pipe at proper speed and avoid excitation and suction. Lowering of the pipe should be slowed down when approaching the rotary table.



⑨

Mud Filling and Circulating

Mud shall be filled into the casing pipes at a maximum of every 30 pipes. When running the pipe, if mud circulating is needed, use the mud circulation head. Appropriately connect the mud circulation head with the pipe coupling, avoiding damage to the coupling thread and sealing surface. Standard thread compound (with no adhesive and solidified function) should be applied during the assembly of mud circulation head and the pipe coupling.

Thank you!



**BEYOND THE SELF
PURSUIT OF EXCELLENCE**

天津德华石油装备制造有限公司