NSMAX™-GR Recommended Running Manual

Revision	Date	Reason
0	2018.10.01	Creation
1	2019.07.26	Company name is corrected.
2	2021.01.29	Erratum of make-up torque table is corrected.
3	2021.06.30	Stabbing and make up rotation speed is revised.
4	2022.06.06	Requirement for power tong and use of stabbing guide are added.

1. Remarks

This Manual describes the procedure to be followed for running NSMAX™-GR.

2. Preparation

2.1 Use of following Equipment

(1) Power-tong with torque & turn recording system

(2) Power-tong with back-up tong is preferable. R4

2.2 The following tools should be prepared

(1) Thread compound (API modified compound or NSC approved HOCNF yellow compound)

(2) Moustache type brush (to apply compound), Wire brush is prohibited

(3) Stabbing guide

3. Running

3.1 Running procedure

(1) Coupling (hereinafter, “CPLG”) protector is removed

(2) Thread is checked OK

(3) Casing is hanged to rig floor

(4) PIN protector is removed

(5) Thread is checked OK

(6) Alignment of PIN & CPLG is adjusted

(7) Connections are stabbed by stabbing guide

Stabbing guide shall be used at not only make-up, but break-out also. R4

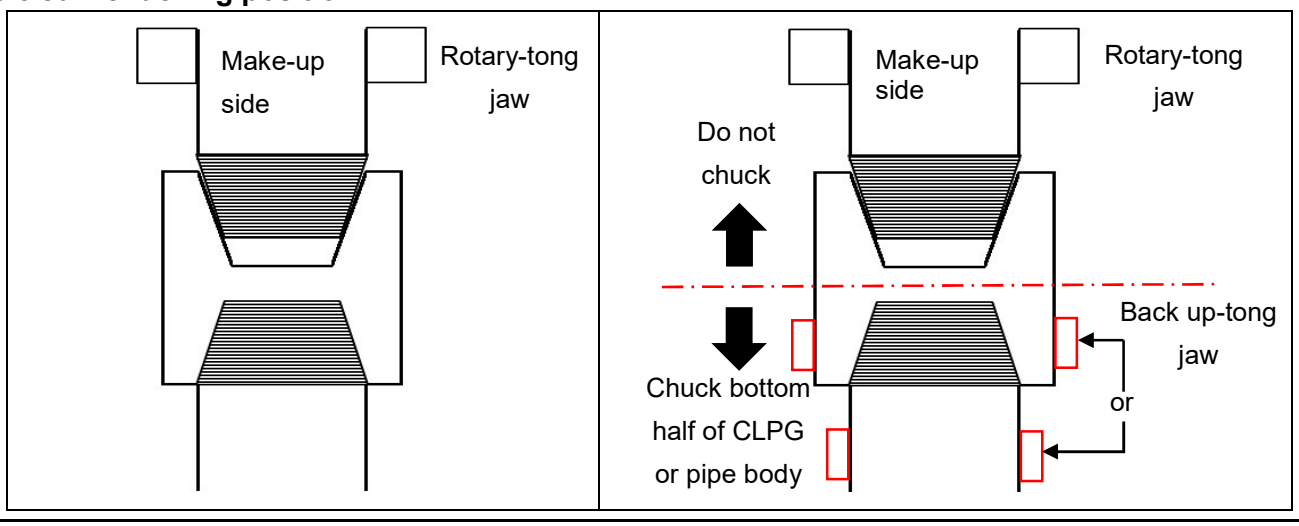
(8) Connections are made-up by power-tong

Note: Pipe has been prepared at Onestopshop with running compound already applied. if not, storage compound is cleaned off and dried, and running compound applied, on both pin & box.

3.2 Thread compound (NSC approved running compound)

API Modified thread compound, or (as yellow dope) Jet Lube HPHT, Jet Lube Run N Seal ECF

3.3 Jaw chucking position



3.4 Max allowable grip mark

Max allowable	Pipe body	CPLG
Grip mark depth	0.6mm	0.6mm

3.5 Make-up torque

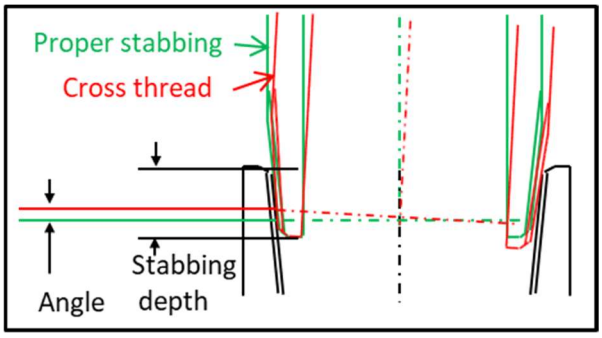
Refer to table 5 and table 6 (section3.8)

3.6 Recommendation for stabbing and make up rotation speed

Stabbing and starting rotation (up to 1 turn) for thread engagement	To fully benefit from NSMAX self aligning feature, special attention is to be paid at stabbing and during the first turn. This is particularly beneficial with high rig floor movements offshore Control the misalignment of the pipe, specifically at the stage of stabbing and first turn engagement, in order to reduce the risk of cross threading, ideally less than 1 degree or 8 in (20 cm) over 40 feet pipe, Start rotation at 4 RPM with high gear, during the first turn, allowing NSMAX self aligning thread design to compensate pipe inertia, keep the rotation even though there is temporary torque build up which can be observed from T-T chart. If rotation is suddenly stopped before 1 turn finished (got cross thread), back off the connection and remake up. Reduce further RPM to mitigate cross-threading. In difficult rig conditions, if cross threading still occurs with 1 RPM, start reversing turn by around half turn to get thread disengagement, before rotating clockwise 1 RPM On the contrary, if no cross-threading is happening, engage the first turn with High Gear at 8 RPM
Make up of Middle stage (around 3 to 4 turns)	High gear up to 15 RPM. 8 RPM is recommended for stable makup. The number of turns for make-up of middle stage are around 3 to 4. Allowable torque humping is acceptable.(section 4)
Make up of final stage (final 1 to 2 turns)	Change to low gear at 4 RPM and complete the make up to target torque Recommended dump value is opt. torque in table 5 or table 6. Final torque should be between min. and max. torque in table 5 or table 6. If the final torque exceeds max. torque due to dump valve malfunction or some other reasons, slow down rotation speed to get the final torque within the specified window (between min. and max. torque).

≪reference≫

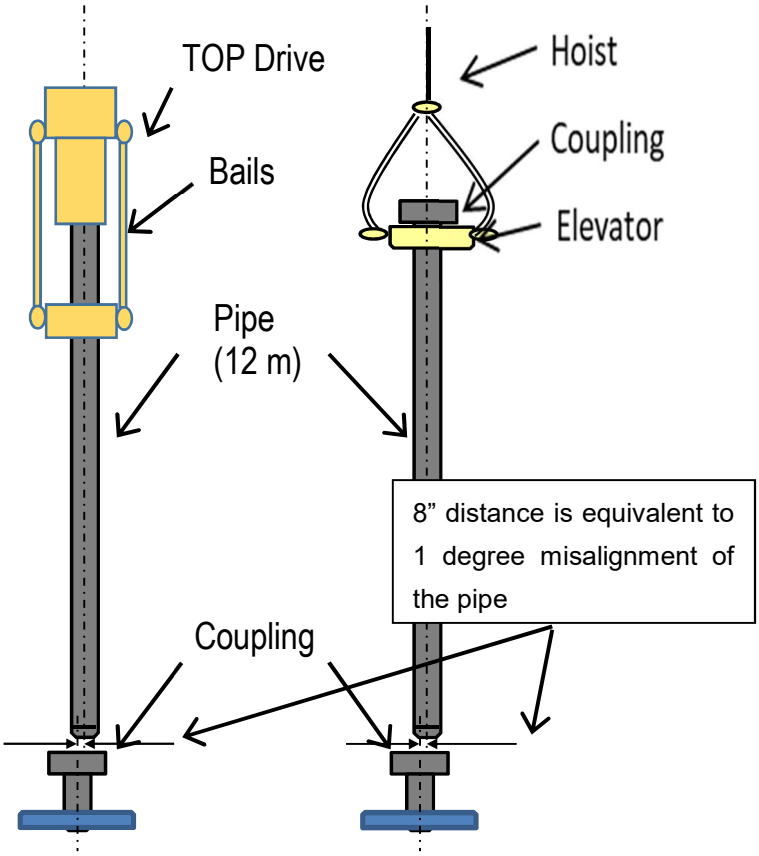
(1) Cross thread angle



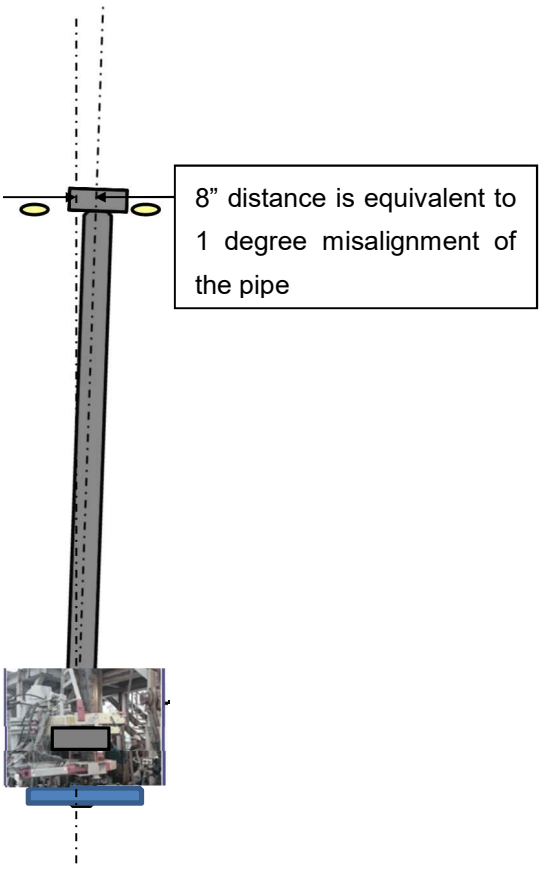
	T.P.I.	O.D.(inch)	
		20	18 5/8
Cross thread angle (degree)	3 threads /inch	0.96	1.03
	5 threads /inch	0.57	0.62

Cross thread angle is around 1 degree for 18-5/8” and 20” NSMAX-GR

(2) The misalignment angle of the pipe of cross thread



The misalignment angle of the pipe at the stage of stabbing



The misalignment angle of the pipe at the stage of half turn rotation after stabbing (Cross thread)

3.7 Thread compound quantity

(table 1) Volume of thread compound

Size				Thread compound (ml)	
OD (")	Nominal Weight (lb/ft)	Wall Thickness		minimum	Maximum
18	94	0.500	inch	120	180
		12.70	mm		
	105	0.562	inch	120	180
		14.27	mm		
	117	0.625	inch	150	230
		15.88	mm		
	119	0.640	inch	150	230
		16.26	mm		
	128	0.688	inch	150	230
		17.48	mm		
18-5/8	87.5	0.435	inch	130	200
		11.05	mm		
	94.5	0.468	inch	130	200
		11.89	mm		
	96.5	0.486	inch	130	200
		12.34	mm		
	101	0.510	inch	130	200
		12.95	mm		
	106	0.531	inch	130	200
		13.49	mm		
	109.4	0.563	inch	130	200
		14.30	mm		
	112	0.579	inch	150	230
		14.71	mm		
	115	0.594	inch	150	230
		15.09	mm		
	122	0.636	inch	150	230
		16.15	mm		
	136	0.693	inch	150	230
		17.60	mm		
20	94	0.438	inch	150	220
		11.13	mm		
	106.5	0.500	inch	150	220
		12.70	mm		
	117	0.563	inch	150	220
		14.30	mm		
	133	0.635	inch	170	250
		16.13	mm		
	144	0.693	inch	170	250
		17.60	mm		

The weight of thread compound to apply on a connection depends of the specific gravity of the used thread compound.

(table 2) Weight of API modified thread compound (Gravity= approximately 1.90/cm^3)

Size				Thread compound (g)	
OD (")	Nominal Weight (lb/ft)	Wall Thickness		minimum	Maximum
18	94	0.500	inch	228	342
		12.70	mm		
	105	0.562	inch	228	342
		14.27	mm		
	117	0.625	inch	285	437
		15.88	mm		
	119	0.640	inch	285	437
		16.26	mm		
	128	0.688	inch	285	437
		17.48	mm		
18-5/8	87.5	0.435	inch	247	380
		11.05	mm		
	94.5	0.468	inch	247	380
		11.89	mm		
	96.5	0.486	inch	247	380
		12.34	mm		
	101	0.510	inch	247	380
		12.95	mm		
	106	0.531	inch	247	380
		13.49	mm		
	109.4	0.563	inch	247	380
		14.30	mm		
	112	0.579	inch	285	437
		14.71	mm		
	115	0.594	inch	285	437
		15.09	mm		
	122	0.636	inch	285	437
		16.15	mm		
	136	0.693	inch	285	437
		17.60	mm		
20	94	0.438	inch	285	418
		11.13	mm		
	106.5	0.500	inch	285	418
		12.70	mm		
	117	0.563	inch	285	418
		14.30	mm		
	133	0.635	inch	323	475
		16.13	mm		
	144	0.693	inch	323	475
		17.60	mm		

(table 3) Weight of Jet Lube HPHT (Gravity=1.33/cm^3)

Size				Thread compound (g)	
OD (")	Nominal Weight (lb/ft)	Wall Thickness		minimum	Maximum
18	94	0.500	inch	160	239
		12.70	mm		
	105	0.562	inch	160	239
		14.27	mm		
	117	0.625	inch	200	306
		15.88	mm		
	119	0.640	inch	200	306
		16.26	mm		
	128	0.688	inch	200	306
		17.48	mm		
18-5/8	87.5	0.435	inch	173	266
		11.05	mm		
	94.5	0.468	inch	173	266
		11.89	mm		
	96.5	0.486	inch	173	266
		12.34	mm		
	101	0.510	inch	173	266
		12.95	mm		
	106	0.531	inch	173	266
		13.49	mm		
	109.4	0.563	inch	173	266
		14.30	mm		
	112	0.579	inch	200	306
		14.71	mm		
	115	0.594	inch	200	306
		15.09	mm		
	122	0.636	inch	200	306
		16.15	mm		
	136	0.693	inch	200	306
		17.60	mm		
20	94	0.438	inch	200	293
		11.13	mm		
	106.5	0.500	inch	200	293
		12.70	mm		
	117	0.563	inch	200	293
		14.30	mm		
	133	0.635	inch	226	333
		16.13	mm		
	144	0.693	inch	226	333
		17.60	mm		

(table 4) Weight of Jet Lube Run N Seal ECF (Gravity=1.28/cm^3)

Size				Thread compound (g)	
OD (")	Nominal Weight (lb/ft)	Wall Thickness		minimum	Maximum
18	94	0.500	inch	154	230
		12.70	mm		
	105	0.562	inch	154	230
		14.27	mm		
	117	0.625	inch	192	294
		15.88	mm		
	119	0.640	inch	192	294
		16.26	mm		
	128	0.688	inch	192	294
		17.48	mm		
18-5/8	87.5	0.435	inch	166	256
		11.05	mm		
	94.5	0.468	inch	166	256
		11.89	mm		
	96.5	0.486	inch	166	256
		12.34	mm		
	101	0.510	inch	166	256
		12.95	mm		
	106	0.531	inch	166	256
		13.49	mm		
	109.4	0.563	inch	166	256
		14.30	mm		
	112	0.579	inch	192	294
		14.71	mm		
	115	0.594	inch	192	294
		15.09	mm		
	122	0.636	inch	192	294
		16.15	mm		
	136	0.693	inch	192	294
		17.60	mm		
20	94	0.438	inch	192	282
		11.13	mm		
	106.5	0.500	inch	192	282
		12.70	mm		
	117	0.563	inch	192	282
		14.30	mm		
	133	0.635	inch	218	320
		16.13	mm		
	144	0.693	inch	218	320
		17.60	mm		

Other thread compounds (especially red or yellow thread compounds) may be used.
Please contact NSC.

Ratio of total thread compound volume = 40% to 50% on PIN, 50% to 60% on CPLG
Thread compound must be applied uniformly to thread as bellow fig.

	
Too little	Too much
	
Just right PIN	Just right CPLG

3.8 Make-up torque

(table 5) Make-up torque table of 55 ksi grade

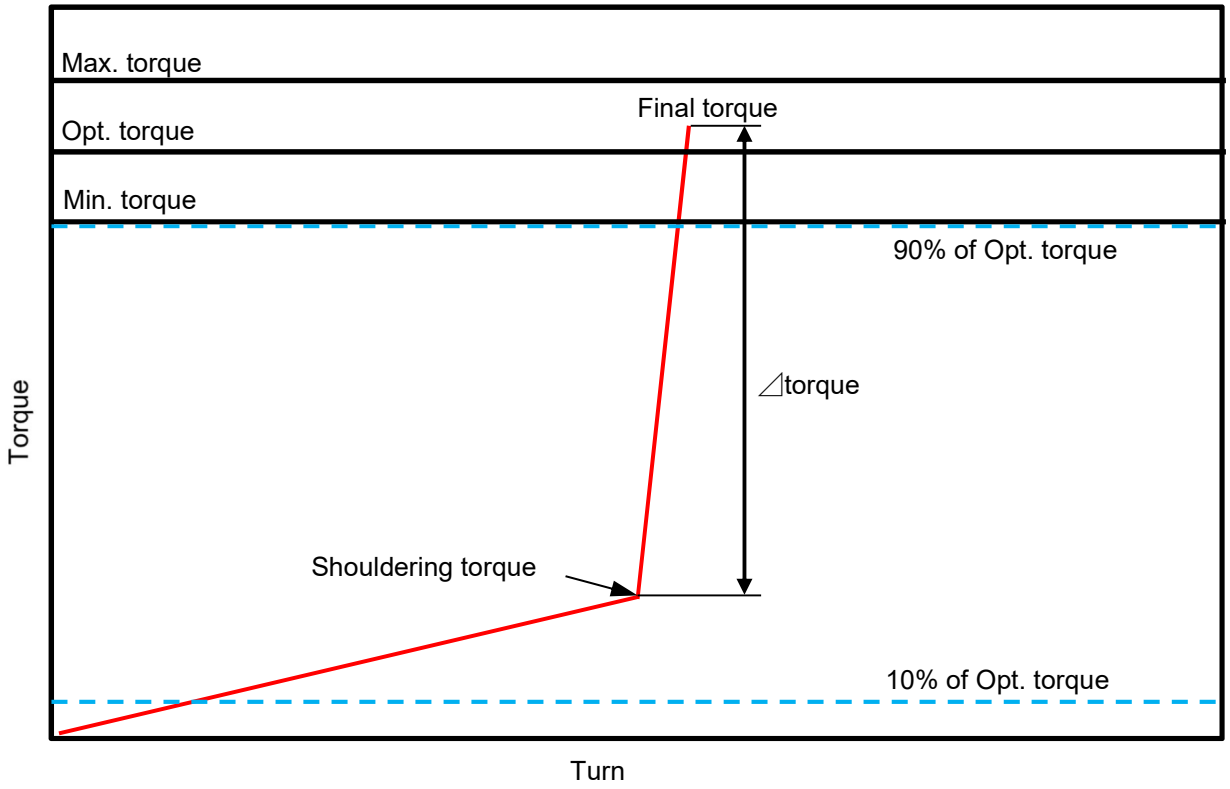
Size			Make-up Torque (ft.lb.)			Make-up Torque (N.m.)		
OD (inch)	Weight (lb/ft)	Wall Thickness	Min.	Opt.	Max.	Min.	Opt.	Max.
18	94	0.500 inch 12.70 mm	15,570	17,300	19,030	21,120	23,460	25,810
	105	0.562 inch 14.27 mm	17,190	19,100	21,010	23,310	25,900	28,490
	117	0.625 inch 15.88 mm	23,850	26,500	29,150	32,340	35,930	39,530
	119	0.640 inch 16.26 mm	24,390	27,100	29,810	33,070	36,750	40,420
	128	0.688 inch 17.48 mm	25,920	28,800	31,680	35,150	39,050	42,960
18-5/8	87.5	0.435 inch 11.05 mm	14,850	16,500	18,150	20,140	22,380	24,610
	94.5	0.468 inch 11.89 mm	14,940	16,600	18,260	20,260	22,510	24,760
	96.5	0.486 inch 12.34 mm	15,570	17,300	19,030	21,120	23,460	25,810
	101	0.510 inch 12.95 mm	16,290	18,100	19,910	22,090	24,550	27,000
	106	0.531 inch 13.49 mm	16,920	18,800	20,680	22,950	25,490	28,040
	109.4	0.563 inch 14.30 mm	17,730	19,700	21,670	24,040	26,710	29,390
	112	0.579 inch 14.71 mm	22,950	25,500	28,050	31,120	34,580	38,040
	115	0.594 inch 15.09 mm	23,580	26,200	28,820	31,980	35,530	39,080
	122	0.636 inch 16.15 mm	25,290	28,100	30,910	34,290	38,100	41,910
	136	0.693 inch 17.60 mm	27,360	30,400	33,440	37,100	41,220	45,340
20	94	0.438 inch 11.13 mm	15,750	17,500	19,250	21,360	23,730	26,100
	106.5	0.500 inch 12.70 mm	16,650	18,500	20,350	22,580	25,090	27,600
	117	0.563 inch 14.30 mm	18,540	20,600	22,660	25,140	27,930	30,730
	133	0.635 inch 16.13 mm	26,370	29,300	32,230	35,760	39,730	43,700
	144	0.693 inch 17.60 mm	28,440	31,600	34,760	38,560	42,850	47,130

(table 6) Make-up torque table of 95 ksi grade

Size			Make-up Torque (ft.lb.)			Make-up Torque (N.m.)		
OD (inch)	Weight (lb/ft)	Wall Thickness	Min.	Opt.	Max.	Min.	Opt.	Max.
18	94	0.500 inch 12.70 mm	25,470	28,300	31,130	34,540	38,370	42,210
	105	0.562 inch 14.27 mm	28,170	31,300	34,430	38,200	42,440	46,690
	117	0.625 inch 15.88 mm	36,090	40,100	44,110	48,940	54,370	59,810
	119	0.640 inch 16.26 mm	36,900	41,000	45,100	50,030	55,590	61,150
	128	0.688 inch 17.48 mm	39,240	43,600	47,960	53,210	59,120	65,030
18-5/8	87.5	0.435 inch 11.05 mm	24,930	27,700	30,470	33,810	37,560	41,320
	94.5	0.468 inch 11.89 mm	25,110	27,900	30,690	34,050	37,830	41,620
	96.5	0.486 inch 12.34 mm	25,290	28,100	30,910	34,290	38,100	41,910
	101	0.510 inch 12.95 mm	26,460	29,400	32,340	35,880	39,870	43,850
	106	0.531 inch 13.49 mm	27,450	30,500	33,550	37,220	41,360	45,490
	109.4	0.563 inch 14.30 mm	28,890	32,100	35,310	39,170	43,530	47,880
	112	0.579 inch 14.71 mm	39,150	43,500	47,850	53,090	58,980	64,880
	115	0.594 inch 15.09 mm	40,140	44,600	49,060	54,430	60,470	66,520
	122	0.636 inch 16.15 mm	40,140	44,600	49,060	54,430	60,470	66,520
	136	0.693 inch 17.60 mm	40,680	45,200	49,720	55,160	61,290	67,420
20	94	0.438 inch 11.13 mm	27,630	30,700	33,770	37,470	41,630	45,790
	106.5	0.500 inch 12.70 mm	27,900	31,000	34,100	37,830	42,040	46,240
	117	0.563 inch 14.30 mm	30,960	34,400	37,840	41,980	46,650	51,310
	133	0.635 inch 16.13 mm	40,500	45,000	49,500	54,920	61,020	67,120
	144	0.693 inch 17.60 mm	40,770	45,300	49,830	55,280	61,420	67,570

4. Make-up chart

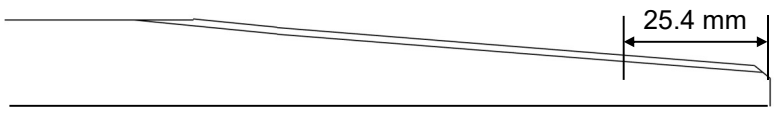
4.1 Make-up chart acceptance criteria



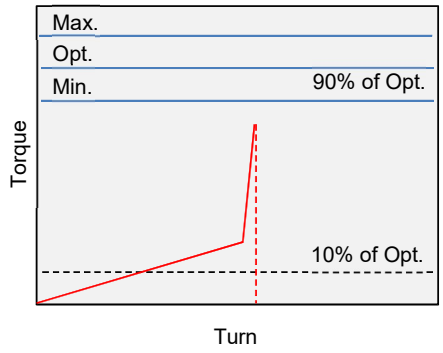
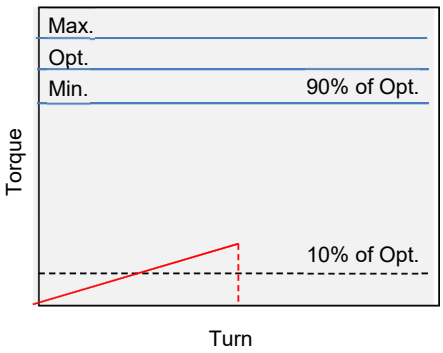
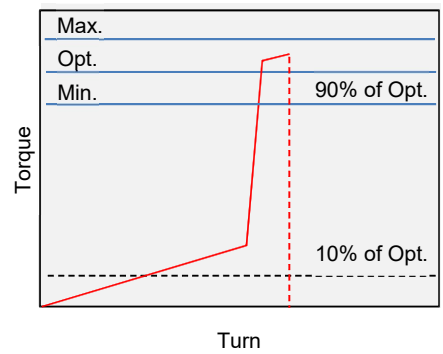
When make-up chart meets following standards, make-up is accepted.
(1) Final torque must be between Min. torque and Max. torque.
(2) Shouldering torque must be between 10% of Opt. torque and 90% of Opt. torque.
(3) ⊿toque ≧ 5% of Opt. torque

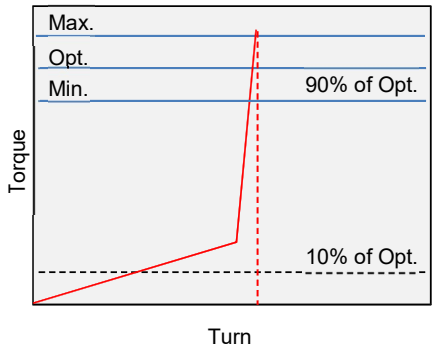
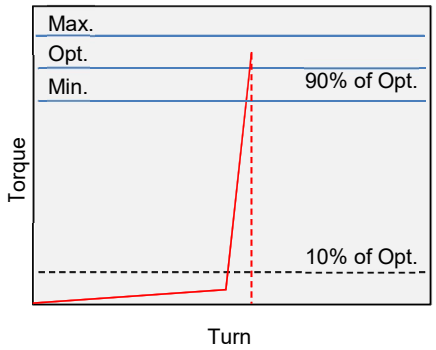
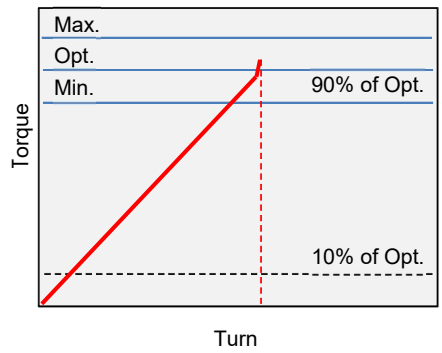
IF make-up chart was Unacceptable make-up chart (refer to 4.2 Unacceptable make-up chart), Break-out fully and inspect thread. If no galling was observed, remake-up again.

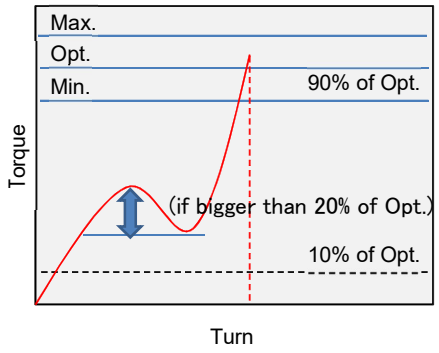
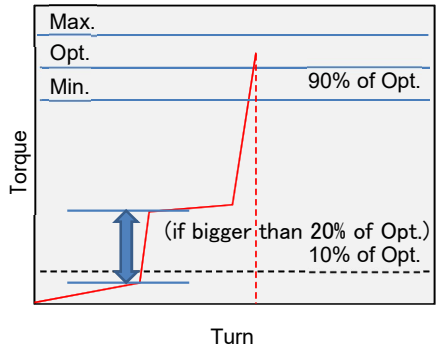
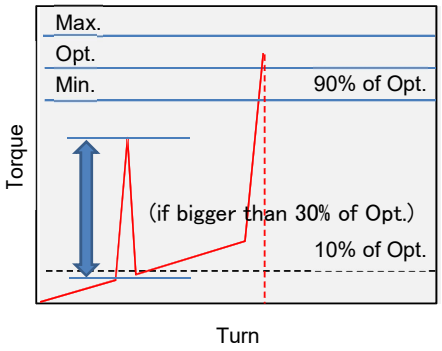
In case of break-out and inspect thread, following criteria should be applied:
- The connection must be free of heavy damage*
(*that can not be dressed with a small file in less than 5 minutes)
- For the threads, no severe galling but minor or partial galling and light damage (scratches, indentations, knocks) are acceptable and can be dressed up with a small file or a hone, provided that the defect can be completely removed, to blend with the original profile.
- Stabbing, hand-tight and make-up damages on front 3 threads area (25.4mm) of PIN is acceptable, if it is not heavy protrusions, since that area is non-thread seal area.



4.2 Unacceptable make-up chart

Unacceptable make-up graph	Possible Causes	Consequences	Remedial Actions
Low Final Torque with shoulder contact 	1. Wrong dump valve setting 2. Unable to select low gear 3. Operator stopped make-up	1. Risk of back out 2. Risk of leak	1. Breakout fully 2. Clean and inspect threads 3. If OK, remake
Low final torque with no shoulder contact 	1. Wrong dump valve setting 2. Unable to select low gear 3. Operator stopped make-up	1. Risk of back out 2. Risk of leak	1. Break out fully 2. Clean and inspect threads 3. If OK, remake
Yielding / Plastic deformation 	1. Bad load cell calibration 2. Wrong torque values entered 3. Mixing interchangeable connection with big difference in weight or grade 4. Wrong connection types	1. Risk of jump in 2. Risk of coupling parting 3. Risk of leak 4. No drift –damage to pin and box shoulder area	1. Break out fully 2. Clean threads 3. Visual inspect counter bore for deformation 4.If OK, remake

High final torque 	1. Bad load cell calibration 2. Wrong dump valve setting	1. Risk of coupling parting	1. Break out fully 2. Clean threads 3. Visual inspect counter bore for deformation 4. If OK, remake to correct torque
Low shoulder torque or no shoulder torque 	1. Friction factor <1.0 2. Wrong type of thread compound 3. Compound not stirred 4. Compound too hot 5. Compound contaminated 6. Wrong torque values 7.Wrong connection types	1. Risk of back out 2..Risk of leak	1. Break out fully 2. Clean and inspect threads 3. If OK, remake
High shoulder torque or no shoulderling 	1. Wrong type of thread compound 2. Not enough thread compound 3. Compound too cold 4. Compound not stirred 5. Friction factor >1.0 6. Girt/dirt in thread compound 7. Bad load cell calibration 8. Wrong torque values 9. Wrong tong arm setting 10. Misalignment between pin and box 11. Threads not clean 12. Threads galled 13. Threads damaged 14.Wrong connections	1. Risk of leak 2. Risk of threads galling	1. Break out fully 2. Clean and inspect threads 3. If OK, remake

Humping (if bigger than 20% of Opt.) 	1.Too much thread compound 2.Slight misalignment 3. Bad stabbing	1. Risk of threads galling	1. Break out fully 2. Clean and inspect threads 3. If OK, remake
Step in graph (if bigger than 20% of Opt.) 	1. Turns counter sticking	1. No immediate consequence but what happened during make up when turns were not recorded?	1. Partial break out 2. Acceptable but correct problem
Spike in graph (if bigger than 30% 0f Opt.) 	1. Late gear change 2. Radio interference (mobile phone or lightening) 3. Electrical interference caused	1. No consequence for connection	1. Break out fully 2. Clean and inspect threads 3. If OK, remake

5. Thread locking compound

If thread locking compound is required, the following processes have to be carried out.

5.1 Usage of thread locking compound

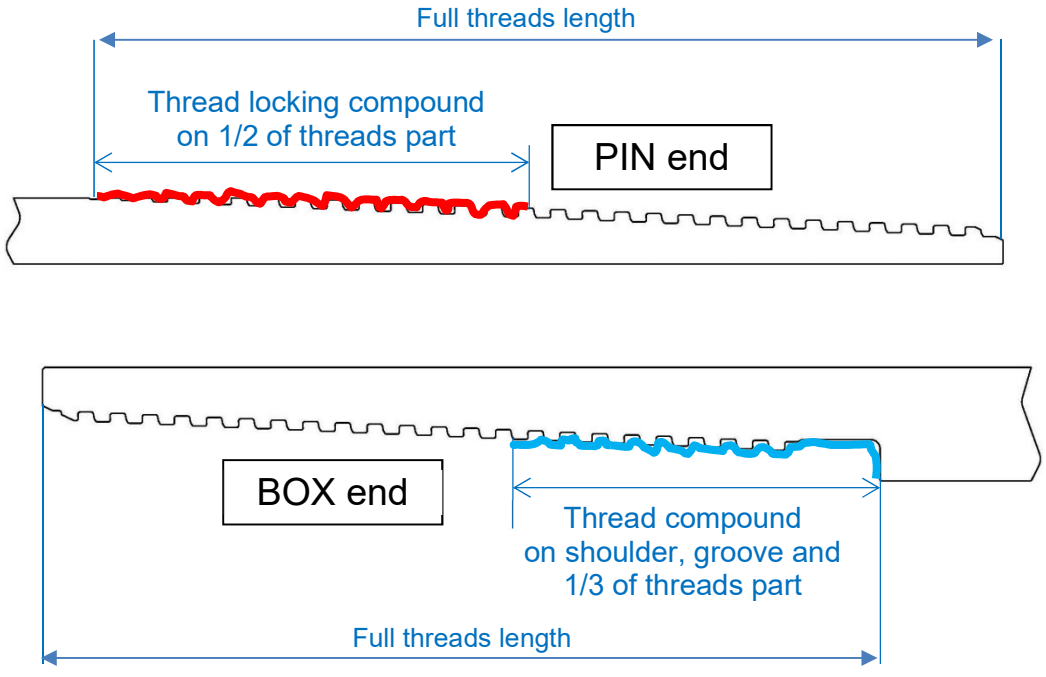
(1) Thread locking compound with friction factor equal or slight above 1.0 is selected
(even friction factor is 1.0, we recommend to use following higher optimum torque)
(2) Normal Optimum torque x 1.3 is set to new Optimum torque
(3) New Optimum torque x 1.1 is set to new Maximum torque
(4) Dump torque is changed to new Optimum torque
(5) Thread compound is applied on CPLG shoulder and firsts threads (1/3 of threads part)
(6) Thread locking compound is applied on imperfect threads and first perfect thread of PIN end (half of threads part)
(7) Make-up

5.2 acceptance criteria

⊿torque ≧ 20% of normal Optimum torque

For example, in the case of 18 5/8" x 101# NT-95DE NSMAX™-GR, use the torque value (ft.lbs) as shown below.

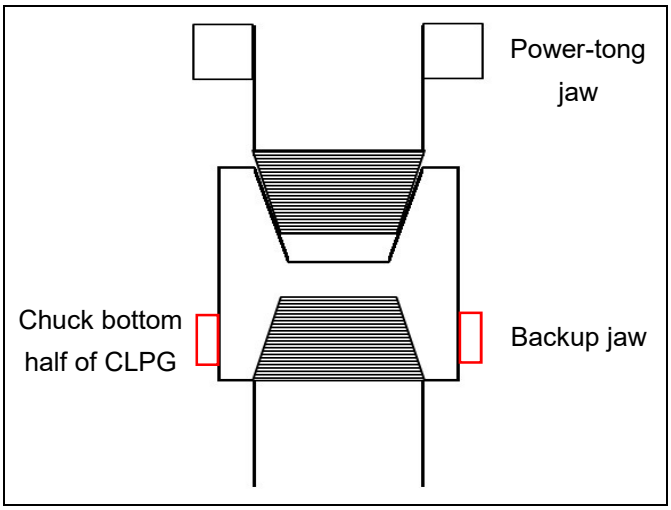
compound	Maximum Shoulder	Minimum Torque	Optimum Torque	Maximum Torque
Normal thread compound	23,520	26,460	29,400	32,340
Thread lock with FF≧1.0	⊿torque ≧ 5,880		38,220	42,042



6. Break-out

6.1 Break-out procedure

(1) Alignment of PIN & CPLG is adjusted
(2) Pipe & CPLG is chucked as bellow



(3) Break-out 4turns by low gear
(4) Break-out fully by chain tong

End of documents