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EVRlock EB Gen2 Running Procedure

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1.0 TRANSPORTATION AND HANDLING

- Prior to unloading casing, a visual inspection of the load should be performed to ensure that all thread protectors are in place.
- If pipe are found with missing protectors, they should be identified for additional inspections.
- Thread protectors must be securely in place when transporting pipe to and from location, during loading and unloading, and whenever pipe is moved.
- Load or unload with slings or forklift. **Do not unload pipe with end hooks.**

2.0 INSPECTION AND PREPARATION

- Ensure that the drive nubbins, float equipment, thread compound, thread lock, stabbing guides, drifts, snakes and any other required accessories are on location. Visually inspect to ensure that all accessories are in good condition.
- Adequate space must be given on the pipe racks for cleaning and visual inspection, if required.
- Remove both thread protectors from each joint on the pipe racks and full length drift each joint prior to running in the hole. Use an appropriately sized Teflon or nylon drift and snake. All no-drifts should be clearly identified on the pipe and set aside.
- Verification of the mill end make-up should be performed on several mill ends to verify that the coupling has not come loose during transportation. A visual inspection of the ID should show the mill end pin engaged with the shoulder with no visible gap. Using a 1/32" feeler gauge, it should not be able to freely pass through the pin nose/shoulder around the circumference. Additionally the coupling should not be able to be freely moved on the pin by hand.
- Pin end thread protectors must be replaced prior to moving pipe and should be free from contamination.

3.0 EQUIPMENT

Top Drive Rigs

- When <u>not</u> using bales and elevators, EVRAZ recommends the use of a casing running tool as opposed to a drive nubbin. Use of a casing running tool eliminates the possibility for damage to the coupling threads due to excessive interference.
- If a drive nubbin is used, it should be inspected before use to ensure it is in good condition. Additional inspections should be performed after every six make-up/break out cycles.
- Drive nubbins must not abrade or damage thread forms or phosphate coating.

Power Tongs

- Tongs should be size-matched and be of sufficient power to apply the maximum torque for the given casing size and wall thickness.
- Dies should be clean and in good condition.
- If a snub line is used, it should be connected and set at a 90 degree angle to the tong's arm.

Thread Compound

- EVRlock EB Gen2 is shipped with Topco Greenseal Supreme (Canada) or Best-o-Life (USA). Other thread compounds may be used upon consultation with EVRAZ Technical Services.
    - If other API 5A3 compliant thread compounds are utilized the torque correction factor noted by the compound manufacturer must be considered
- The thread compound container must remain free of all contaminants (i.e.: water, ice, sand, solvent, sawdust, etc.) and should be thoroughly stirred prior to application to ensure proper mixing of solid particles.
- During cold weather, the thread compound should be stored inside and applied warm, if possible. In addition, steaming of the pipe ends is recommended to facilitate application of thread compound.
- Apply a thin, even coat of the thread compound to the pin and coupling threads.
    - A 4" wide (100) paint brush is suitable for applying thread compound on the pin threads.
    - A bottle brush or a dope brush is recommended for applying thread compound to the coupling threads.
- A thin even coat is defined as being approximately 0.030" to 0.040" thick (0.75 to 1) with the buttress form still clearly visible. If an excessive amount of compound has been squeezed out at the power tight position reduce the amount of compound being applied to the threads.
- The guidelines noted above are provided as a recommendation only. Other thread compound application practices that exhibit good workmanship and that produce expected levels of connection make-up and break-out performance may be adopted.

4.0 RUNNING PROCEDURE

- EVRAZ recommends the use of bales and elevators paired with conventional or integral power tongs to run EVRlock EB. In addition, EVRAZ recommends avoiding the use of a drive nubbin since they have been shown to cause damage to the coupling threads.

- Prior to making up the first connection, true vertical alignment of the rig must be checked. Misalignment over the stump in excess of one half pipe diameter must be corrected prior to engagement and make-up.
- The EVRlock EB Gen2 connection has a triangle stamped on the field end pin. Please note that this triangle is not located at the same distance from the pin nose as API buttress but at the "make-up loss" distance identified in Table 1.
    - When making up to API Buttress accessories (such as float collars, shoes, etc) please refer to PC-REP-008 which may be found on EVRAZNA.com

For Tong Operation

- The tongs should not exceed 25* RPM while running in, and the speed should be reduced to 8 to 12 RPM* for the last turn.
  * Minor Excursions (+15%) beyond these RPM values can be tolerated on an intermittent basis, however; should more than 25% of the connections that have been made-up exhibit excursions be noted, the cause of variance should be determined.

Do not shift to low gear within one thread turn of shoulder position.

- EVRAZ recommends the use of a stabbing guide. Stabbing should be done carefully to avoid pin nose damage. It is also particularly important that reasonable vertical alignment be maintained during make-up to avoid galling.
- To avoid contamination inside of the coupling, the stump should be covered when the tower pipe is being moved into position. The cover must be removed just prior to stabbing.
- Pipe should be vertical and spin freely during make-up. Elevators should not interfere with this process.

Running Torque & Triangle Position

- During initial connection make-up on the first 10 joints, the location of the face of the coupling in relationship to the triangle must be visually verified. The nominal make-up position at power tight should position the face of the coupling at the triangle base when the connection has shouldered.
- Should coupling rotation be observed on the mill end during final power tight make-up verify the position of the coupling face relative to the mill end triangle.
- Please refer to EVRAZNA.com for the recommended torque values for the diameter, weight, & grade being run (or refer to Section 6 of this document).

- Computer Torque monitoring is not required to run this connection but can provide positive feedback that the connection has ran and shouldered correctly and that no plastic deformation has occurred. If Computer torque monitoring is utilized, please contact EVRAZ Technical Services should additional technical support be required.

Lowering the Pipe

- Following each make-up, lower the joint down the hole at a modest speed before engaging the slips.
- Place the stabbing guide on the coupling and repeat the running process.

Rotating the String

- String rotation speed should not exceed make-up speed
- When increasing rotation torque past the maximum make-up torque, the maximum rotational speed should be lowered as per Figure 1
- Rotating at a torque greater than maximum operational torque shall be avoided. Sustained rotation at these levels will lead to premature casing failure.
- It is up to the operator to establish working safety factors to ensure that the Max operating torque is not exceeded during installation.

5.0 POST JOB

- All unserviceable and laid down joints must be painted red on the end which was damaged and clearly identified on the pipe body as to the reason for rejection.
- All unused connections following the job, including all accessories, must have storage compound applied and thread protectors firmly installed. This includes damaged connections. Damage may be minimal and thus repairable.

Thread Protectors

- EVRlock EB Gen2 thread protectors are recyclable. All thread protectors are to be collected and returned for recycling. To coordinate pick up from your rig location please contact your local approved protector recycler to arrange for provision of protector transportation bags and collection of the protectors.

6.0 TECHNICAL NOTES

- EVRlock EB Gen2 is an “Enhanced Buttress” connection that utilizes a modified coupling to create pin-on-shoulder buttress thread variant.

- The buttress triangle stamp on the mill ends and the field ends pins are not located at the same axial position as detailed in API 5B. These witness marks should not be referenced when making up accessories. Please refer to PC-REP XXXX for guidance

Table 1 Dimensions

Diameter		Weight		Drift Diameter (Standard)		Coupling Diameter		Make-Up Loss	
USC	Metric	USC	Metric	USC	Metric	USC	Metric	USC	Metric
4 ½	114.3	11.6	17.3	3.875	98.4	5.250	133.4	4.34	110.2
4 ½	114.3	13.5	20.1	3.795	96.4	5.250	133.4	4.34	110.2
4 ½	114.3	15.1	22.5	3.701	94.0	5.250	133.4	4.34	110.2
5 ½	139.7	17.0	25.3	4.767	121.1	6.300	160.0	4.53	114.9
5 ½	139.7	20.0	29.8	4.653	118.2	6.300	160.0	4.53	114.9
5 ½	139.7	23.0	34.3	4.545	115.4	6.300	160.0	4.53	114.9
7	177.8	23.0	34.3	6.241	158.5	7.875	200.0	4.90	124.5
7	177.8	26.0	38.7	6.151	156.2	7.875	200.0	4.90	124.5
7	177.8	29.0	43.2	6.059	153.9	7.875	200.0	4.90	124.5
7	177.8	32.0	47.6	5.969	151.6	7.875	200.0	4.90	124.5

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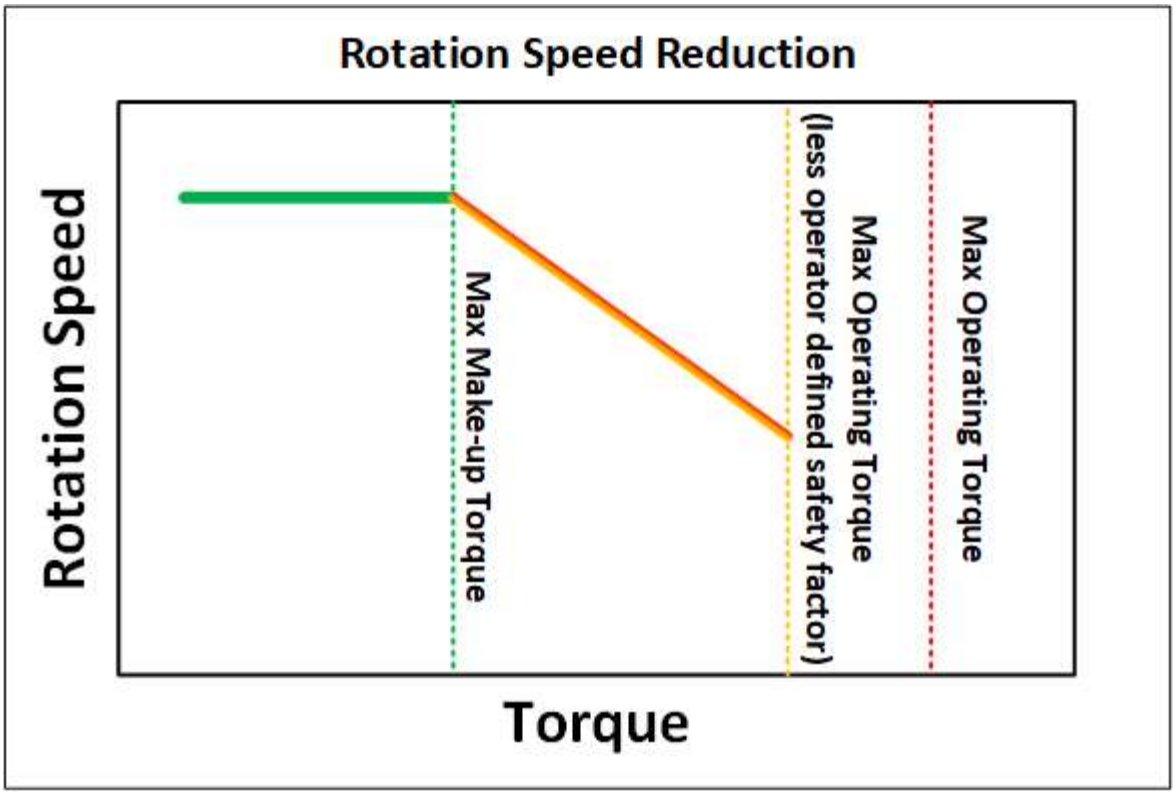

Figure 1, Rotation limit based on running torque

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Table 2a Make-up Torque (Imperial Units)

OD (in)	Weight (lb/ft)	Grade Strength (ksi)	Make-up Torque * (ft.lbs)				Max Operating Torque (ft.lbs) [1]	Plastic Torque [2] (ft.lbs)
			Optimal	Max	Min	Max Shoulder		
4.500	11.6	55	4,900	5,400	4,400	4,400	8,200	8,450
		110	7,400	8,100	6,700	6,700	12,250	12,750
	13.5	110	8,500	9,400	7,700	7,700	14,100	16,000
	15.1	110	11,000	12,100	9,900	9,900	18,300	20,000
7.000	23	80	13,600	15,000	12,200	12,200	22,600	25,300
	26	110	25,200	27,700	22,700	22,700	42,000	44,700
	29	110	30,800	33,900	27,700	27,700	51,400	53,400
	32	110	30,800	33,900	27,700	27,700	65,200	65,500

7.000 in and greater, min delta: 2,000 ft.lb 4 1/2 in, min delta: 500 ft.lb

Table 2b Make-up Torque (Metric Units)

OD (mm)	Weight (kg/m)	Grade (ksi)	Make-up Torque * (Nm)				Max Operating Torque (Nm) [1]	Plastic Torque (Nm) [2]
			Optimal	Max	Min	Max Shoulder		
114.30	17.3	55	6,600	7,300	5,950	5,950	11,100	11,450
		110	10,000	10,950	9,050	9,050	16,600	17,250
	20.1	110	11,500	12,700	10,400	10,400	19,100	21,650
	22.5	100	14,900	16,400	13,400	13,400	24,800	27,100
177.80	34.3	80	18,400	22,300	16,500	16,500	30,600	34,300
	38.7	110	34,150	37,550	30,750	30,750	56,900	60,600
	43.2	110	41,750	45,950	37,550	37,750	69,650	72,400
	47.6	110	41,750	45,950	37,550	37,750	88,400	88,800

177.8mm and greater, min delta: 2,700 Nm ,114.3mm, min delta: 675 Nm

1. Max operating torque is derived from bias tolerance test specimens, machined to represent a set of test specimens that represent minimum torque resistance based on geometry. The set of specimens with the lowest measured torque is selected, and an offset is generated from the post shouldering point of the curve. Where this offset intercepts the torque-turn curve is taken as the max operating torque.
2. Plastic Torque is derived from the same bias tolerance test specimen identified in note 1. This is the point on the torque-turn curve taken at the intercept of the slope defined in note 1 with an additional offset of 0.1 delta turns

Revision History

Revision	Date	Details
0	February 24, 2025	First issue

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