HydraQuaker™ Hydraulic Drilling Jar

The HydraQuaker™ hydraulic drilling jar is capable of delivering a heavy Impact in vertical and deviated holes during drilling, fishing, or workover operations. Designed to operate as an integral part of a drillstring, the tool can withstand normal drilling conditions of torque, pump pressure, temperatures, and long periods of use. A unique temperature compensation process enables the HydraQuaker™ jar to provide consistent impact, blow after blow, even in harsh environments. By adjusting the amount of of surface push or pull, the operator can adjust the magnitude of the impacts in either direction; the frequency of impacts can also be controlled. "Cocking," or resetting, the HydraQuaker™ jar is automatic-once the desired impact has been delivered, simply raising or lowering the string allows the proprietary metering mechanism to be reactivated.

Placement Recommendations

Always place the HydraQuaker™ jar in the transition pipe-HWDP or drill collars-between the BHA and the drillpipe. The recommended position is in the HWDP.

Maintain 20% of weight on bit (WOB) between the drilling jar and the neutral point to ensure that the jar is outside the neutral point transition zone.

Always place a minimum of 10% to 20% of the expected drilling jar load as hammer weight above the jar.

Always be aware that the placement of the drilling jar needs to be reconsidered when there is a change in the BHA, WOB, or other drilling parameter.

Do not place stabilizers or other BHA components with an OD larger than that of the jar, above the drilling jar.

The HydraQuaker™ jar should be located a minimum of 90 ft away from the top stabilizer in the BHA, and at least 90 ft from any drill collar or HWDP change above or below the jar.

Never use the jar as a crossover between drill collars and HWDP, or between two different sizes of collars. High bending stresses occur in these locations and increase the risk of tool damage.

Jar placement is critical. Always contact your OSC representative to determine the optimal placement.

Jar can be placed in tension or compression; see table to the right for differences. We recommend running in tension when possible.

Operating Instructions

Working string weight above the jar= Drag + String weight from drilling jar to surface.

Drag = Weight indicator reading up – Weight indicator reading down.

Placement Recommendations

HydraQuaker™ Jar in Tension	HydraQuaker™ Jar in Compression
Neutral point is below the jar	Neutral point is above the jar
Drilling jar remains "open" and cocked for down jarring while drilling	Drilling jar remains "closed" and cocked for up jarring while drilling
No risk of premature firing of drilling jar when picking up off bottom	Drilling jar may fire prematurely if drillstring is picked up off bottom too quickly
Pump-open force will help extend the drilling jar open while drilling	Drilling jar must be picked up off bottom and allowed to bleed through detent before tripping out or setting the slips, to prevent accidental firing
Generally used in low angle wellbores when BHA below the optimal jar position provides sufficient weight to drill	Unavoidable in highly deviated wellbores when BHA below the optimal jar position provides insufficient WOB

Specifications

Tool OD, in	Tool ID, in	Tool Joint Connection, in	Maximum Detent Working Load, lbf	Tensile Yield Strength,lbf	Torsional Yield Strength, lbf.ft	Tool Weight, lbm	Maximum Hole Diameter Vertical Hole, in	Maximum Hole Diameter Horizontal or Highly Deviated Hole, in
4.75	2.25	3 ½ API IF	90,000	452,737	19,116	1,800	$7\frac{7}{8}$	$9\frac{7}{8}$
6.25	2.75	4 ½ API IF	185,000	761,980	41,315	2,400	$9\frac{7}{8}$	$10\frac{5}{8}$
6.5	2.75	4 ½ API IF	185,000	916,152	56,395	2,600	$10\frac{5}{8}$	$12\frac{1}{4}$
8	3	$6\ \frac{5}{8}$ API REG	300,000	1,302,363	102,056	3,800	$17\frac{1}{2}$	22

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Jarring Up

- Establish the 'jar load up (overpull)' to be applied, subject to the maximum detent working load shown in the table of specifications. Jar load up= Final Weight indicator reading up, before impact- working string weight above the jar.
- Apply pull to the drillstring as per the established final weight indicator reading and wait for the impact. The weight indicator will display a small loss just before Impact, corresponding to the retraction of the drillstring. There should be a clear change in the reading after impact. The table shows the delay (detent time) from the time the jar is cocked to when it actually fires, as a function of applied load.
- To repeat the operation, slack off until positive resistance is reached, normally indicated by a visible sign such as a bobble on the weight indicator needle. The indicator reads about 10,000 lbf lower than the string weight above the jar; apply the previous 'jar load up' again.

Jarring Down

- Always shut down pumps before attempting to jar down, because the pump pressure affects the downward jar action.
- Select the 'jar load down (slack-off)', subject to
- The maximum detent working load shown in the table of specifications
- The weight of the drill collars or Hevi-Wate™ transition drillpipe (HWDP) just above the jar, whichever is less. Jar load down= Working string weight above the jar – Final weight indicator reading down, before impact.
- Slack off as per the established final weight indicator reading, and wait for impact. See the table for delay times versus load.
- To repeat the operation, pull up until the weight indicator reads about 10,000 lbf higher than the string weight above the jar, and immediately slack off to the previously selected 'jar load down' again.

Changeout Recommendations

The HydraQuaker™ jar should be changed out periodically for servicing. Please contact your OSC representative for changeeout recommendations.

Delay Times

Tool OD, in	Up Detent Load, lbf	Up Detent Time for Full Detent, s	Down Detent Load, lbf	Down Detent Time for full Detent, s
4.75	60,000	30 to 60	40,000	30 to 60
6.25	75,000	30 to 60	45,000	30 to 60
6.5	75,000	30 to 60	45,000	30 to 60
8	75,000	30 to 60	45,000	30 to 60

Down jar impacts may not be transmitted through shock tools run in the lower drilling assembly. When jarring down with a small number of drill collars or HWDP on top of the jar, select a load that will not buckle the drillpipe run above the jar. Adequate weight just above the jar provides optimum impact for jarring dow

Key Terms

Detent: the mechanism by which the hydraulic fluid in the jar is slowly metered through the detent ring orifice when a load is applied, thus providing a delay before the jar fires.

Full Detent: jar in fully open (or closed) position prior to applying jar load

Short Detent: jar in partially open (or closed) position prior to applying jar load

Detent or Delay Time: time elapsed between cocking and firing the jar

Changeout Recommendations

		Changeout Hours, h							
Hole Size, in	**Temperature, degF**	**4.75 in OD Jar**		**6.25 in OD Jar**		**6.5 in OD Jar**		**8 in OD Jar**	
		Rotating in tangent/ horizontal section	Rotating in vertical or build/drop section	Rotating in tangent/ horizontal section	Rotating in vertical or build/drop section	Rotating in tangent/ horizontal section	Rotating in vertical or build/drop section	Rotating in tangent/ horizontal section	Rotating in vertical or build/drop section
6 1/8	100-200	300	200						
6 1/8	200-300	200	200						
6 1/8	300-400	200	200						
6 1/8	400-500	150	150						
6 3/4	100-200	250	150						
6 3/4	200-300	200	150						
6 3/4	300-400	200	150						
6 3/4	400-500	150	150						
7 7/8	100-200	200	150						
7 7/8	200-300	200	150						
7 7/8	300-400	200	150						
7 7/8	400-500	150	150						
8 3/8	100-200	150		150	150				
8 3/8	200-300	150		150	150				
8 3/8	300-400	150		150	150				
8 3/8	400-500	150		150	150				
8 3/4	100-200	150		300	200	400	300		
8 3/4	200-300	150		300	200	300	300		
8 3/4	300-400	150		300	200	300	300		
8 3/4	400-500	150		150	150	150	150		
9 7/8	100-200	100		250	200	300	200	400	300
9 7/8	200-300	100		250	200	300	200	300	300
9 7/8	300-400	100		250	200	300	200	300	300
9 7/8	400-500	100		150	150	150	150	150	150
10 5/8	100-200			200		250	150	350	250
10 5/8	200-300			200		250	150	300	250
10 5/8	300-400			200		250	150	300	250
10 5/8	400-500			150		150	150	150	150
12 1/4	100-200					200		300	200
12 1/4	200-300					200		300	200
12 1/4	300-400					200		300	200
12 1/4	400-500					150		150	150
17 1/2	100-200							250	150
17 1/2	200-300							250	150
17 1/2	300-400							250	150
17 1/2	400-500							150	150
22	100-200							200	
22	200-300							200	
22	300-400							200	