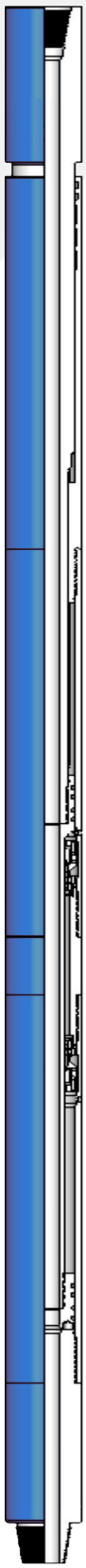
ALLIANCE
DRILLING TOOLS

Hammer Drilling Jar



HAMMER
Dual Action Hydraulic Drilling Jar

Features and Benefits

- **Telescoping splined mandrel to deliver maximum torque.**
- **Controlled fluid metering for consistent time delay results.**
- **No minimum load required for jarring impact.**
- **Variable impacts attained by simple up and down motion.**
- **Will operate in temperatures up to 400 degrees with proper circulation.**
- **All jars are of the proper length for easy racking.**
- **All jars are delivered with safety clamps to prevent accidental firing.**
- **Upper flex collars designed with an integral elevator recess for easy handling.**

Specifications

OD (in)	5	6-1/2
ID (in)	2-1/4	2-3/4
Tool joint size (API)	3-1/2" API IF (NC38)	4-1/2" API IF (NC50), 4-1/2" XH (4" API IF-NC46)
Tensile yield (lbf)	450,000	850,000
Torsional yield (lbf-ft)	24,000	44,000
Maximum overpull up/down (lbf)	100,000	180,000
Approximate length extended (ft)	33	33.5
Approximate weight (lb)	1,350	2,350
Firing travel up/down (in)	5.00	6.00
Total stroke (in)	17.06	18.88
Maximum bottomhole temp (°F)	400	400
Pump-open area (in.)	8.59	13.04

*Torsional yield is based on the yield of the "body connections".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Description

The ADT HAMMER is a dual action hydraulic jar that can provide **UP and DOWN** jarring blows of variable intensity to free stuck drill strings. The complete HAMMER assembly consists of the hydraulic drilling jar (HDJ) and an upper and lower flex joint. The upper flex joint is designed with an integral elevator recess for easy handling.

Handling/Running

The HAMMER will be delivered to the rig in the open position with the safety clamp in place, ready to run. **It is important that the safety clamp be left in place until the tool is made up in the string to prevent accidental firing.** Do not use tongs on the body of the jar except on the flex joint rotary connections.

The HAMMER can be run in compression or tension but should not be run in the neutral zone, 60 feet from a stabilizer or reamer, or transitional zones between collars or pipe of varying diameters.

Once the jar is installed in the drill string, and with the jar in tension from the weight of the BHA below the jar, remove the safety clamp and trip in the hole**. Do not handle the jar in a way that will make the tool close.** This will cause it to cock in the upstroke position and could result in unintentional firing of the jar. Care should be taken when running in the hole particularly through tight spots and doglegs. Although the HAMMER will normally be in tension and fully extended when the bit tags bottom, there is always the possibility that it can become cocked during the trip in. While this does not present an operational problem, it is a good idea to **be aware of the status of the tool.** If you suspect that the jar may be in the cocked position, set the slips, leave the elevators on the drill pipe and wait for approximately ten minutes for the weight of the BHA to pull the jar into the extended position prior to beginning the drilling.

Jar Placement

Rule of thumb: Place your jars in tension if possible while keeping enough weight above them for effective down-jarring. Make sure to maintain 20% of anticipated WOB between your jars and the neutral point as a safety factor. **Jars ran in or around the neutral point transition zone are susceptible to failure.** If jars are ran in compression, buckling forces can be a factor particularly in low angle holes but not so much in holes exceeding 15 degrees. It should not be a factor at all as long as your WOB does not exceed the buoyed weight of your drill collars

HAMMER

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Jarring

To load or cock the HAMMER Jar -

Compression or closed position placement - If the drill string becomes stuck, and the jars are placed in the closed positions in compression or below the neutral point it will be necessary to pick up the drill string and allow the jar to bleed off. This generally takes between 45 and 120 seconds depending on the amount of weight hanging below the jar, drag and pump open force if pumps are on. Watch for free travel on the weight indicator as it cocks. When the weight indicator indicates that the operator is applying over-pull, he can either continue to apply over-pull to jar up or he can slack back off the drill string to the desired load and jar down.

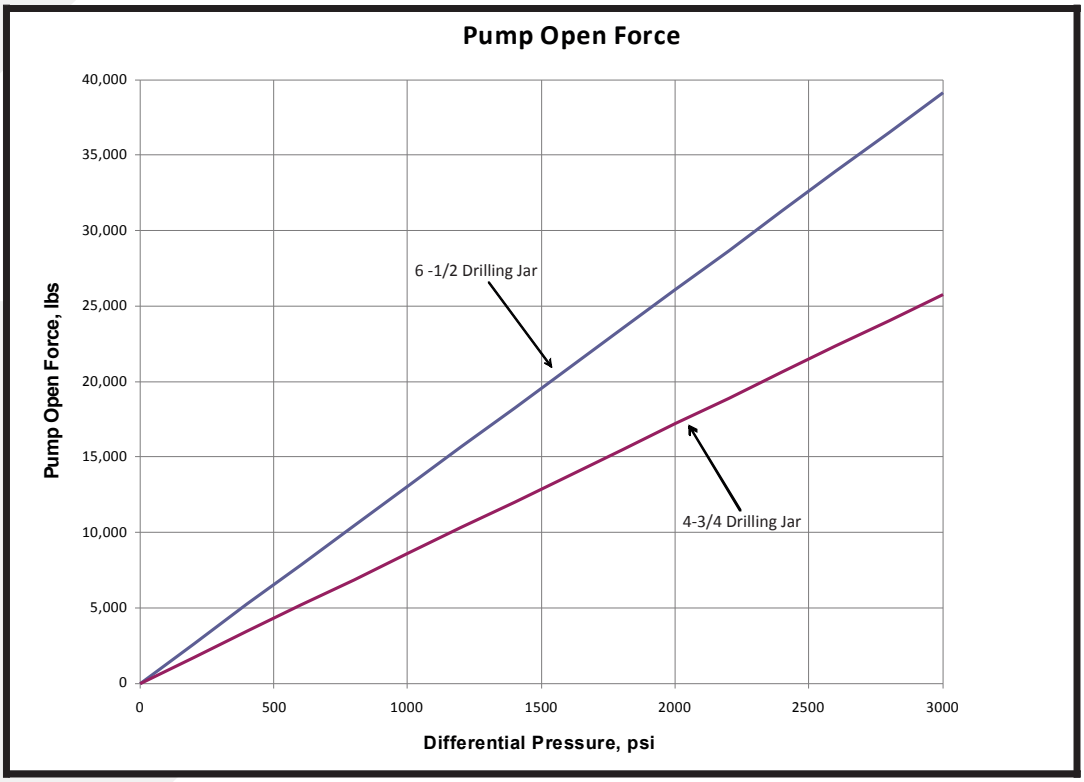
Tension or open position placement - If the drill string becomes stuck and jars are placed in tension or above the neutral point, commence jarring as follows. Slack off enough weight to the HAMMER to overcome hole drag and pump open force. In deviated holes the hole drag may be significant but the operator should be able to spot the free travel of the jar once these forces are overcome. The operator should see 2 cycles of free travel, a long period of free travel followed by a short period of weight coming off the weight indicator followed immediately by a shorter period of free travel. This is normal and to be expected. Make sure that the operator continues to slack off **slowly** through the second cycle of free travel to insure that the jar is fully cocked and functional. Once the 2nd cycle of free travel is complete and more weight is coming off the weight indicator, the operator can choose to **jar up** or **jar down** by either picking up on the drill string or continuing to slack weight off the drill string. To jar down, continue to slack off until you reach the desired jarring load, set the brake and wait for the jar to trip. This will generally take between 45 and 120 seconds depending on the amount of load transmitted to the jar. If the jar does not hit down, re-cock the jar by picking up on the drill string until free travel is observed and the weight indicator indicates that over-pull is being applied. At this point, slack off slowly again through the free travel and continue to slack off to a point further than you did on the first attempt. Once the jar fires successfully, pick up the drill string and watch for free travel on the weight indicator as it re-cocks. When the weight indicator indicates that the operator is applying over-pull, he can either continue to apply over-pull to jar up or he can slack back off the drill string to the desired load and jar back down. The jarring force that will be transmitted to the stuck point is equal to the amount of weight lowered onto the jar minus the pump open force or the amount of over-pull applied to the jar plus the pump open force (see Table 1.1) Refer to the table 1.2 and 1.3 for example up and down jar calculation.

The safety clamp must be reinstalled prior to racking back the jar or removing it from the drill string.

Maximum Recommended Change Out Hours

Hole Size (Inches)	Temp (°F)	4-3/4" OD Jar		6-1/2" OD Jar	
		Rotating in Straight/ Horizontal Section Only	Rotating in deviated or build/drop angle section	Rotating in Straight/ Horizontal Section Only	Rotating in deviated or build/drop angle section
6-1/8"	100-200	300	100		
6-1/8"	200-300	200	100		
6-1/8"	300-400	200	100		
6-1/8"	400-500	150	100		
6-3/4"	100-200	200	100		
6-3/4"	200-300	200	100		
6-3/4"	300-400	200	100		
6-3/4"	400-500	150	100		
7-7/8"	100-200	100	75	400	200
7-7/8"	200-300	100	75	300	200
7-7/8"	300-400	100	75	300	200
7-7/8"	400-500	100	75	150	150
8-3/4"	100-200			400	200
8-3/4"	200-300			300	200
8-3/4"	300-400			300	200
8-3/4"	400-500			150	150
9-7/8"	100-200			300	200
9-7/8"	200-300			300	200
9-7/8"	300-400			300	200
9-7/8"	400-500			150	150
12-1/4"	100-200			200	100
12-1/4"	200-300			200	100
12-1/4"	300-400			200	100
12-1/4"	400-500			150	100

Pump Open Force



Definition: Pump open force is the force caused by the differential pressure between the jar bore and the annulus bore while circulating. It has the effect of pumping the tool open.

Effect of pump open force on the jarring operation: Pump open force makes it more difficult to cock the jar in the up jarring sequence but also adds to the impact load. In the down jarring sequence the pump open force makes it more difficult to fire the jar by holding the tool in the open position and also reduces the impact load.

Table 1.2
Example Up Jar Calculation

	(Lbf)
Total drill string weight- load indicator reading	210,600
Estimated weight below jar	-32,400
Weight above jar	178,200
Desired up jar force	+80,000
Load indicator reading before adjustment	258,200
Pump open force adjustment	-13,000
Hole drag adjustment	+20,000
Indicator reading to trip jar upward	265,200
Increase string load indicator reading from 178,200 to 265,200 to produce 80,000 up jar force	

Table 1.3
Example Down Jar Calculation

	(Lbf)
Total drill string weight– load indicator reading	210,600
Estimated weight below jar	-32,400
Weight above jar	178,200
Desired down jar force	-80,000
Load indicator reading before adjustment	98,200
Pump open force adjustment	-13,000
Hole drag adjustment	-20,000
Indicator reading to trip jar downward	65,200
Decrease string load indicator reading from 178,200 to 65,200 to produce 80,000 down jar force	