

ST-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)	4-3/4	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)	38,000	69,000
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	15.71



Description

The Flotek **ST-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 **ST-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 **ST-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 **ST-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 cock.** 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 dog-legs. Although the **ST-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 operation.

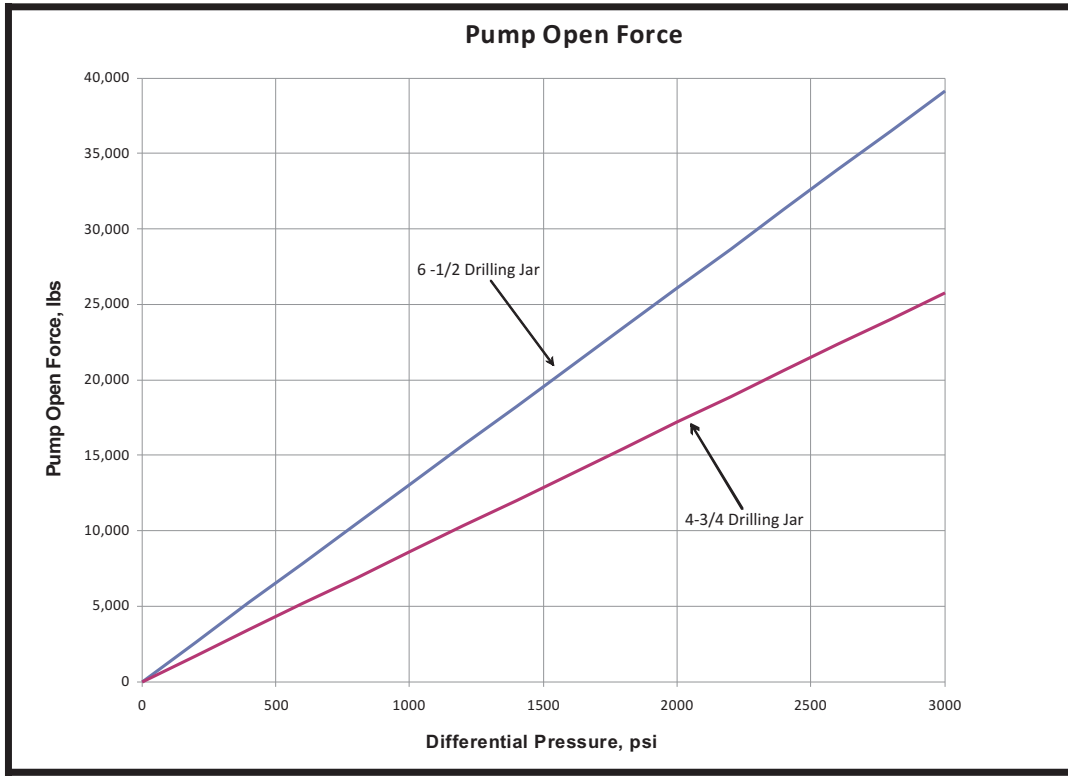
Jarring

If the drill string becomes stuck, commence jarring as follows. Slack off enough weight to the **ST-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. Continue to slack off until the weight indicator shows that the free travel has stopped and more weight is coming off the weight indicator. At this point, the operator can **jar up or jar down** by either picking up on the drill string or slacking weight off of 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 90 seconds depending on the amount of load transmitted to the jar. Once the jar trips, 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 dependent on 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 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.



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	

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LOCATIONS AND CONTACT INFORMATION

Houston

6706 Calle Lozano
Houston, TX 77041
p: 800-486-5859
f: 713-849-5938

Houston

2450 Black Gold Court
Houston, TX 77073
p: 713-896-0445
f: 713-896-0332

Permian Basin

4306 S. County Rd. #1290
Odessa, TX 79765
p: 432-561-9495
f: 432-561-8238

Permian Basin

7703 West Industrial
Midland, TX 79706
p: 432-561-5833

South Texas

1435 Derrick
Robstown, TX 78380
p: 361-289-2724
f: 361-387-4332

FW Basin/Barnett Shale

5281 Old Granbury Rd.
Granbury, TX 76049
p: 817-579-6027
f: 817-579-6109

Louisiana Gulf Coast

125 Spinner Rd
Broussard, LA 70518
p: 337-264-7113
f: 337-837-5789

Louisiana/East Texas

3514 East Texas Street
Bossier City, LA 71111
p: 318-549-1551
f: 318-549-1553

Oklahoma

7040 S. Hwy 81
Chickasha, OK 73023
p: 405-222-2494
f: 405-222-2495

E. Oklahoma/Arkansas

1300 N. Pocola Blvd.
Pocola, OK 74902
p: 918-436-2468

Rocky Mtns/Utah

1377 E. 1500 South
Vernal, UT 84078
p: 435-789-1833
f: 435-789-9752

Rocky Mtns/Wyoming

105 Pasture Rd.
Evanston, WY 82930
p: 307-789-9341
f: 307-789-1410

Rocky Mtns/Wyoming

2130 North Pyrite
Casper, WY 82604
p: 307-265-2096

Rocky Mtns/N. Dakota

6866 Hwy 40
Tioga, ND 58852
p: 701-629-8863

Rocky Mtns/New Mexico

537 E. Amimas
Farmington, NM 87401
p: 505-801-1602
f: 505-325-4247

North East

3407 Grand Ave.
Pittsburgh, PA 15225
p: 412-778-0166

North East

RR 6 Box 6019-3
Towanda, PA 18848
p: 570-265-8762