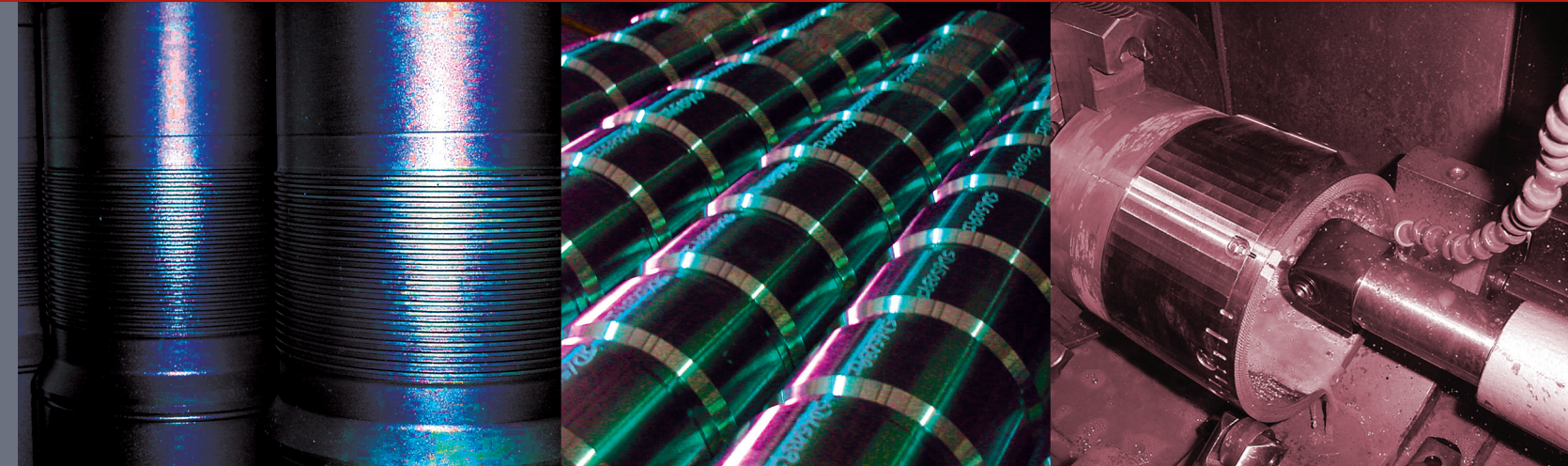




THE CUTTING EDGE

IN MUD MOTORS AND MUD MOTOR COMPONENTS



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MUD MOTOR DESIGN PHILOSOPHY

TomaHawk Mud Motors are designed to meet directional drillers’ criteria with the primary focus on reliability and simplicity in design. This results in an extremely tough and versatile mud motor, which offers the performance necessary for a variety of drilling applications. It also makes the TomaHawk motor one of the easiest to build, maintain and repair. All motor components are engineered with detail in mind and manufactured to exacting standards with only the highest quality materials. Our ISO 9001:2008 certification testifies to an unyielding commitment to quality in everything we design and manufacture.

TomaHawk motors are available in sizes ranging from 1 11/16” to 11 1/4” diameters. TomaHawk motors are “mud lubricated”, which means that a portion of the drilling fluid flows through the bearing stack to cool and lubricate the bearings. A “sleeve on sleeve” upper radial bearing provides support and controls the flow of fluid through the bearing stack.

The TomaHawk bearing pack features multiple tiers of super hardened thrust bearing races. This along with rock bit ball bearings, provide the endurance necessary for long grueling motor runs. A lower mandrel catch is standard in all motor sizes. This catch prevents the bit from being lost in the hole, in the event of a mandrel shaft failure. The Backbone of the TomaHawk mud motor is the patented transmission coupling, which is the industry standard for flexible torque transmission in downhole motors. It has a long history of downhole use and has proven itself to be reliable and economical.

TomaHawk mud motors are extremely versatile in that they can be configured to accept virtually any manufacturers power section. From high-speed low torque, to low-speed high torque, TomaHawk has the motor to meet any driller’s needs.



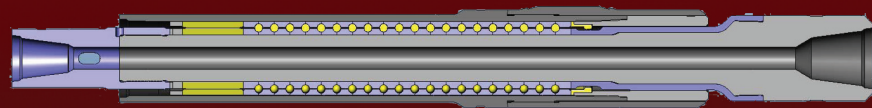
BEARING PACK

TomaHawk’s new SuperHawk series motors are on the cutting edge of mud motor technology, strength and performance. All major torque carrying components including the bit mandrel and transmission couplings have been redesigned and enlarged to handle the increased torque of “Even-Walled” and “Hard-Rubber” power sections. Thrust and radial bearing capacity has been increased and a new, improved carbide coating used on radial bearings provides extended wear life. A uniquely designed mandrel catch device provides reduced stress concentration over previous designs and supports the mandrel shaft reducing bending stress. A redesigned stator connection reduces cracked threads and provides protection from corrosive drilling fluids. These improvements allow the SuperHawk motor to easily handle the most extreme drilling conditions while utilizing the increased torque from “Even-Walled” and “Hard-Rubber” power sections. This enables drillers to maximize rate of penetration and be highly competitive in Today’s drilling market. SuperHawk motors are available in sizes ranging from 1 11/16” to 11 1/4” diameters and are available in several configurations including adjustable bent housing, fixed bend housing, or straight housing with TomaHawk’s jaw clutch or flexshaft driveshaft.

Key Features of the TomaHawk SuperHawk Motor:

- Durable mud lubricated bearing assembly
- Exceptionally strong forged alloy steel bearing mandrel
- Improved mandrel catch device
- Higher thrust and radial capacity
- Improved radial bearing carbide coating
- Enlarged TomaHawk “Bolt Style” transmission couplings
- Larger and stronger flow diverter and rotor connections
- Improved stator connection
- Compatible with “Even-Walled” and “Hard-Rubber” power sections

* Patent #'s 7,445,061;6,799,646;5,205,789; other patents pending



MUD MOTORS

TomaHawk designs and manufactures a full line of mud motors ranging in size from 1 11/16” to 11 1/4 ” diameters.

Standard features:

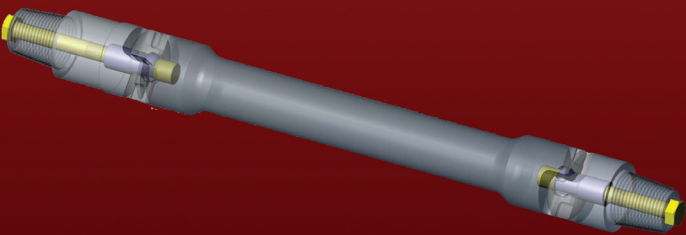
- Mud Lubricated Bearing Pack
- High Strength Forged Alloy Steel Output Shaft
- Bearing Housing with screw on stabilizer
- Through hardened thrust bearing races
- Carbide clad upper and lower radial bearings
- Super Strong jaw clutch drive couplings
- Straight, fixed bend, or adjustable bent housing
- Customer selected power section from any manufacturer
- Crossover sub (top sub)

Optional Features:

- Float Bored top subs
- Slick, integral blade, or welded blade stabilizers
- Flex shaft drive coupling for straight motor applications
- Rotor catch
- Flow bypass rotor nozzles

DRIVE COUPLINGS

TomaHawk jaw clutch flexible drive couplings feature a two-lobe design with hard metal weld on the contacting surfaces. These couplings are extremely strong, durable and can be re-worked after worn to extend the useful life. TomaHawk’s latest design improvement to the jaw clutch uses high strength hex bolts and a uniquely designed “catch” to hold the assembly together. This new design improves the chance of pulling the entire motor from the hole in the event the rotor catch is activated.



TomaHawk’s flex rod is a solid flexible rod, which can be substituted in place of the jaw clutch drive couplings for straight motor applications. This option offers reliability and economy for straight motor applications.

* Patent Pending



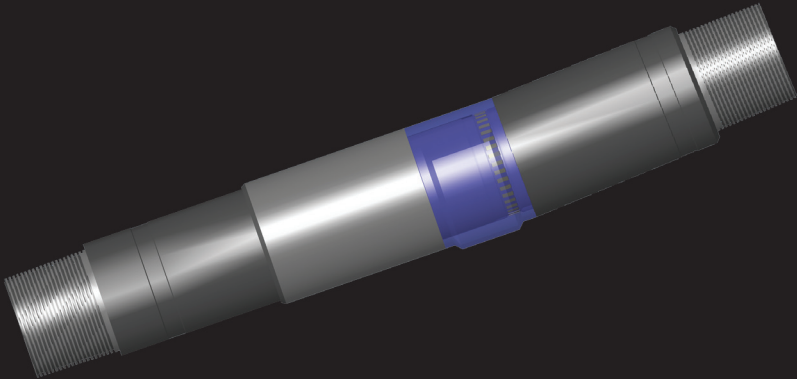
POWER SECTIONS

TomaHawk’s bearing and drive assemblies can be configured to accept virtually any manufacturers powersection. We can accommodate any lobe/stage configuration from high speed, low torque 1/2’s up through the high torque low speed 9/10’s. We can also accommodate the new “even walled” and “hard rubber” power sections.

DRIVE HOUSINGS

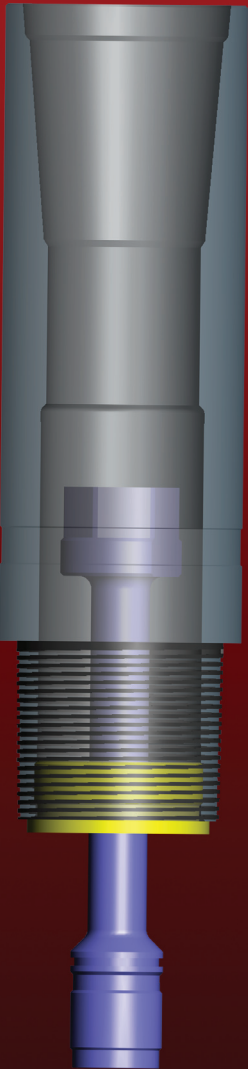
TomaHawk offers straight, fixed bend, or adjustable bent housings. The Talon series adjustable bent housings are infinitely adjustable from 0 – 3 degrees, feature quick and easy angle adjustments, offer a large I.D. Bore, a replaceable wear pad and non torque dependant angle alignment, which ensures there is no “slipping” or misalignment of angle settings. *4-degree Talon adjustable bent housings are available upon request.

*Patent # 6,799,646



TOP SUB

The top sub is available with a customer specified top connection. Other options include a rotor catch, which prevents loss of the rotor and possibly the entire motor in the event of an outer connection failure and an optional float bore which eliminates the need to run an additional float sub above the motor.



TOMAHAWK SUPERHAWK MOTOR SPECIFICATIONS

Motor Size	1 11/16"	2 1/8"	2 7/8"	3 1/2"- 3 3/4"	4 3/4"	6 1/4"	6 1/2" - 6 3/4"	7 3/4" - 8"	9 5/8"
Rec. Hole Size (in)	1 13/16" - 3"	2 5/8" - 3 1/4"	3 1/2" - 4 3/4"	4 3/4" - 5 7/8"	6" - 7 7/8"	7 7/8" - 8 3/4"	7 7/8" - 9 7/8"	9 7/8" - 12 1/4"	12 1/4" - 17 1/2"
Std. Bit Connection	1" MT	1 1/2" MT	2 3/8" Reg.	2 7/8" Reg.	3 1/2" Reg.	4 1/2" Reg.	4 1/2" Reg.	6 5/8" Reg.	7 5/8" Reg.
Std. Top Connection	1" MT	1 1/2" MT	2 3/8" Reg.	2 7/8" Reg.	3 1/2" I.F.	4 1/2" Reg.	4 1/2" I.F.	6 5/8" Reg.	6 5/8" Reg.
Max WOB Operating (lbs)	5,600	9,700	10,400	16,000	38,500	68,500	110,000	116,000	140,000
Max. Continous WOB (lbs)*	2,800	4,850	5,200	8,000	19,250	34,250	55,000	58,000	70,000
Max Bit Pull (lbs)	30,000	39,000	70,000	150,000	190,000	300,000	380,000	450,000	800,000
Max Body Pull (lbs)	45,500	90,000	165,000	238,000/318,000	403,000	675,000	625,000/832,000	1,000,000	1,450,000
Bit To Bend, ABH (in)	NA	NA	31.25	50.50	63.00	66.75	82.50	88.50	101.00
Bit To Bend, Fixed (in)	NA	NA	27.75	40.50	52.69	62.25	64.25	68.50	77.00

* Optimum motor life