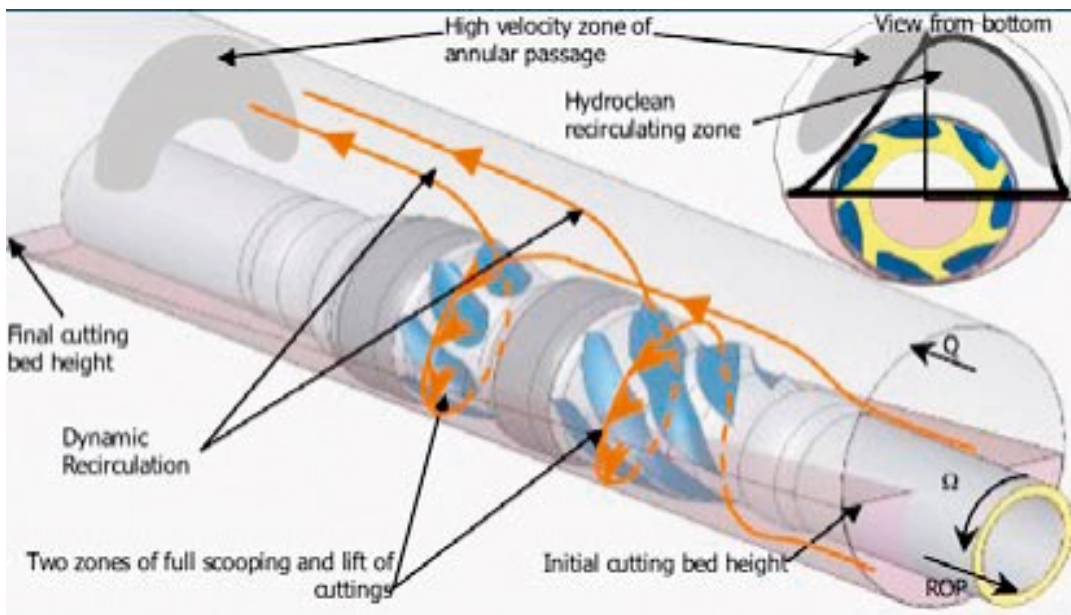


HYDROCLEAN – REDUCING NON-PRODUCTIVE TIME



Hydroclean drill pipe and heavy weight drill pipe is a new generation hole-cleaning and torque-management tool patented by VAM Drilling. Hydroclean reduces or eliminates problems associated with cuttings build-up and excess torque and drag in complex or non-conventional wells.

Integrally machined on full length joints, the upsets have specially designed grooves or blades that are the primary feature of Hydroclean. In these bladed sections, the combination of rotational speed, flow rate and the specially designed angles produce a number of mechanical and hydrodynamic effects that significantly improve hole-cleaning and greatly reduce the amount of non-productive time associated with a build-up of cuttings.

These effects increase the quantity of cuttings reintroduced into the flowstream, resulting in a wellbore that cleans up better and faster. For the operator, this translates into improved drilling performance and significant cost savings.

The bearing section has a slightly larger OD and is supplied with a “casing friendly” hardbanding material. The slightly larger OD provides:

- Protection against borewall damage
- Protection of the bladed section

These bearing sections also spread out the bearing load and improve tool life. Each bearing section is specially designed to allow easy repair using standard automated hardbanding machines. When properly spaced in the drillstring,

Hydroclean provides:

- Reduced operating costs with reduction of wiper trips, backreaming and sweeps
- Improved hole-cleaning efficiency (60%), reduction in torque-and-drag loads (30%) and improved ROP (25%)
- Optimized hydraulics and pressure management, reduction of pressure losses by more than 50%.



HYDROCLEAN – REDUCING NON-PRODUCTIVE TIME

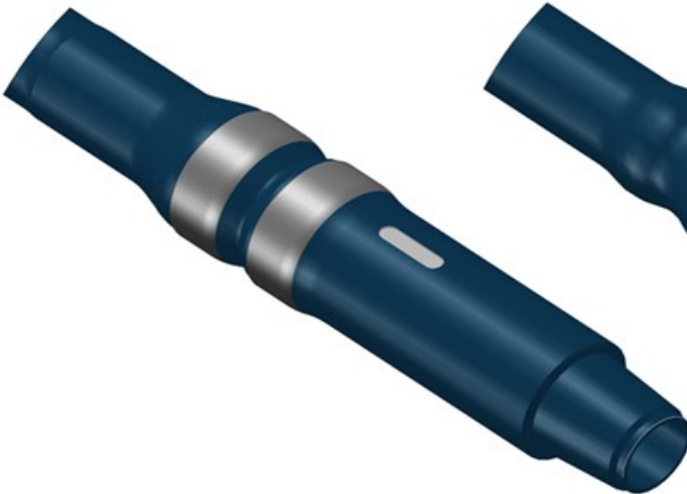
Hydroclean drill pipe is manufactured with welded construction and comprised of patented dual OD tool joints and three specially designed central upsets machined directly onto the pipe body. Hydroclean heavy weight features a mono block construction consisting of patented dual OD tool joints with two extra length central upsets and the Hydroclean profile machined directly onto the pipe body. Both products are available in Range 2 and Range 3 lengths.

Hydroclean drill pipe is suitable to run with standard handling equipment and is designed

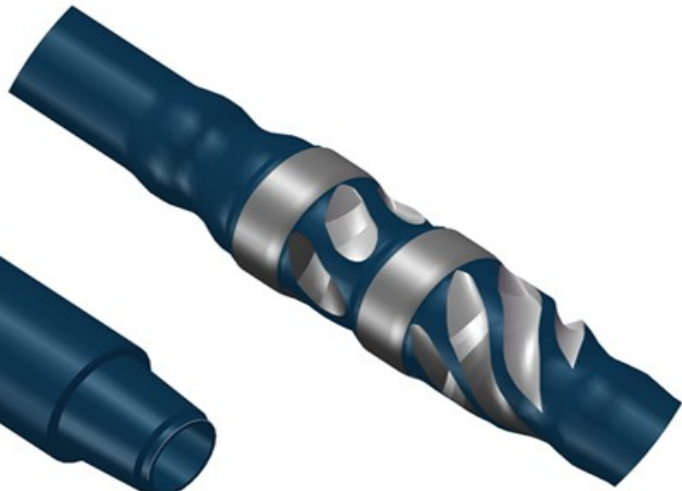
to be integrated directly into the drillstring. Placement recommendations are available from any VAM Drilling regional office.

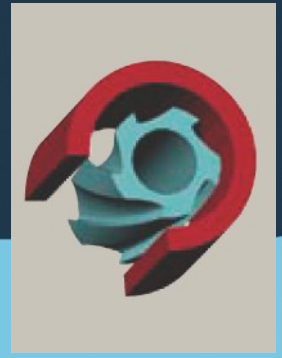
Hydroclean heavy weight drill pipe is run with conventional heavy weight drill pipe. The rugged design of the two extended Hydroclean sections makes it ideally suited to assist with hole-cleaning in the BHA. Experience has shown that placing Hydroclean heavy weight drill pipe as near as possible to the large OD BHA components will significantly reduce the risk of pack-off in this critical area.

Patented dual OD tool joint



Specially designed grooves improve cuttings transport efficiency





HYDROCLEAN – CONSTRUCTION DATA

Dimensional Data – Hydroclean Drill Pipe

Feature	Size			
	5in	5-1/2 in	5-7/8 in	6-5/8 in
A Body OD	5"	5-1/2"	5-7/8"	6-5/8"
B Body ID	4"	4-1/2"	4-3/4"	5-5/16"
C Tool Joint OD	6-5/8"	7"	7-1/4"	8"
D Tool Joint ID (NC 50)*	3"	3-1/2"	4-3/8"	4-1/4"
E Dual OD	7"	7-3/4"	8"	8-3/4"
F Dual OD Length	5-1/2"	5-1/2"	5-1/2"	5-1/2"
G Bearing Zone Length	8"	8"	8"	8"
H Bearing Zone OD	7"	7-3/4"	8"	8-3/4"
I Hydroclean Length	12"	12"	12"	12"
J Max. Hydroclean OD	6-1/2"	7-1/4"	7-1/2"	8-1/4"
K Central Upset Spacing	7'-6"	7'-6"	7'-6"	7'-6"
L Joint Length	31'	31'	31'	31'

Dimensional Data – Hydroclean Heavy Weight

Feature	Size		
	5in	5-1/2 in	6-5/8 in
Nominal OD	5"	5-1/2"	6-5/8"
Connection	NC50	FH	FH
Tube ID	3"	3-3/4"	4-1/2"
Central Upset OD	6-5/8"	7"	8"
Tool Joint OD	6-5/8"	7"	8"
Tool Joint ID	3"	3-3/4"	4-1/2"
Weight (lb/ft)	57.97	61.59	82.97
Length (ft)	31'	31'	31'

