

TECHNICAL DATA SHEET

RHO HOLE OPENER

TECHNICAL SUMMARY

The RHO is a variable size fixed diameter hole opener. Due to its patented retention method, it is the most versatile and cost effective hole opener in the oilfield industry. It is capable of opening multiple hole sizes by simply changing the arms and cutters. Arms and Cutters are interchangeable and compatible in other body sizes, which will make different hole sizes.

PROVEN APPLICATIONS

- Pre-existing pilot holes
- Clean-out runs
- Vertical and Horizontal
- Oil and Gas, Abandonment, and Geothermal
- Fault Zones and Swelling formations
- Improving cement jobs
- Removing bridges and key seats
- Hole Opening while drilling in certain applications

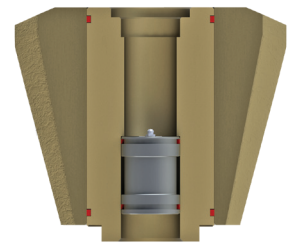
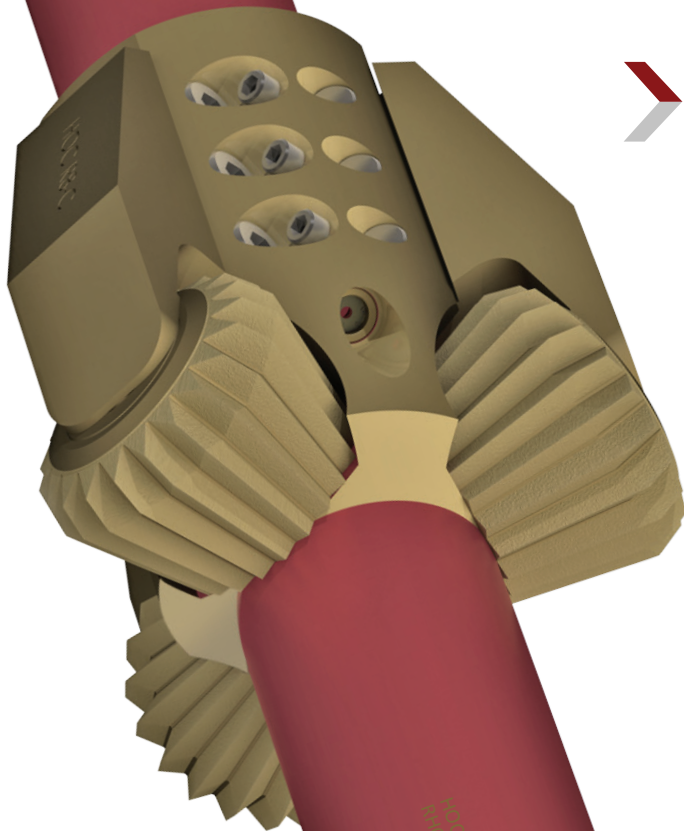


Fig 1.

FEATURES

- The RHO is designed to open hole sizes 7-7/8" to 64" using 9 different body sizes
- Patented and Proprietary cutter retention method
- Cutters are carried on the body of the tool and are retained by interchangeable arms that are held in position by load screws and lock screws
- Cutters are sealed bearing with pressure compensator (fig 1.) actuator to ensure cutter bearings are continually lubricated and hard faced for longer life and extended wear. Specifically designed for RHO
- Designed to cut from gauge to minimum pilot hole requirement in 1 stage
- Arms and cutters come in various standard sizes and increments of 2" with the option of non-standard sizes upon request
- Eliminates need for consumable inventory and the need for size specific bodies
- Robust construction design increases cone pocket cross section by 20% for RHO-7, RHO-9, RHO-14 and RHO-15 bodies
- Efficient hole cleaning due to 6-9 jet configuration
- PDC and ADD (Advanced Drilling Design) cutters are available upon request



RHO HOLE OPENER

TECHNICAL SPECIFICATIONS AND OPERATING PARAMETERS

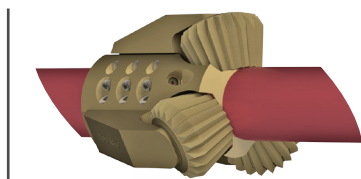
Tool Series	RHO-7	RHO-9	RHO-12	RHO-14	RHO-15	RHO-24	RHO-32	RHO-42
Opening Size Range (in)	7-7/8 - 8-3/4	9-7/8 - 10-1/2	12 - 18	14-3/4 - 26	15-3/4 - 27	24 - 34	32 - 42	42 - 52
Minimum Pilot Hole (in)	4.50	6.50	6.50	8.50 9.875	9.875	17.50	26.00	36.00
Max Roller Cutter Coverage (in)	4.25	4.25	11.50	17.50 16.25	17.50	16.50	16.00	16.00
Cutter/Arm Model	R4	R4	R6	R8	R8	R8	R8	R8
Top Connection (Pin)+	4-1/2" Reg	6-5/8" Reg	6-5/8" Reg	6-5/8" Reg 7-5/8" Reg	7-5/8" Reg	7-5/8" Reg	7-5/8" Reg	7-5/8" Reg
Fishing Neck O.D. (in)	6.00	8.00	8.00	8.00 9.50	8.00 9.50	9.50	9.50	9.50
Bottom Connection (Pin)+	3-1/2" Reg	4-1/2" Reg	4-1/2" Reg	6-5/8" Reg 7-5/8" Reg	7-5/8" Reg	7-5/8" Reg	7-5/8" Reg	7-5/8" Reg
Tool Joint O.D. (in)	4.25	6.00	6.00	8.00 9.50	8.00 9.50	9.50	9.50	9.50
Smallest Internal Diameter (in)	1.00	1.00	1.50	2.00	2.813	2.813	2.813	2.813
Max Flow Rate (GPM)*	600	600	900	1,200	1,400	1,400	1,400	1,400
Number of available Nozzles	6	6	6	6 or 9	6 or 9	6 or 9	6 or 9	6 or 9
Max Temperature (°F)**	400	400	400	400	400	400	400	400
Recommended Rotary Speed (RPM)	50 - 70	50 - 70	50 - 100	50 - 100	50 - 100	50 - 100	50 - 90	50 - 80
Max Drilling Weight (lbs)	8,000	8,000	10,000	20,000	20,000	25,000	25,000	25,000

+ Connections listed are standard but may be customized.

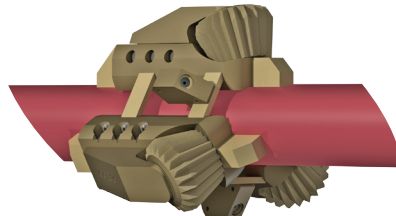
* Flow rates may be increased for hole cleaning and stability by utilizing a jet sub above the tool.

** Higher temperature seals are available upon request.

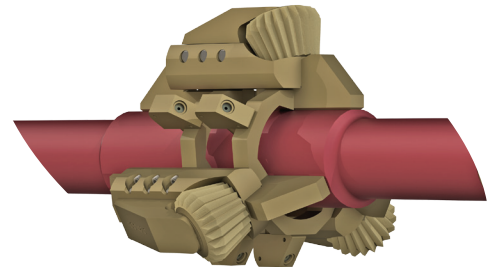
TOOL SERIES CONFIGURATIONS



RHO-7
RHO-12
RHO-9
RHO-14
RHO-15

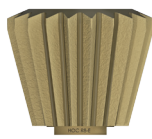


RHO-24

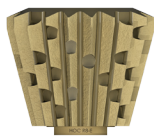


RHO-32
RHO-42

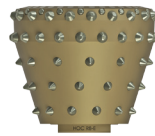
CUTTING STRUCTURE OPTIONS



Mill Tooth

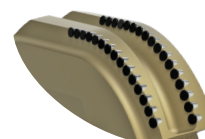


Interrupted Mill Tooth

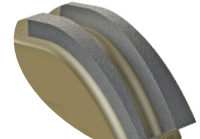


TCI
(Tungsten Carbide Inserts)

Roller Cone



PDC



ADD

Drag Type