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Visit us at www.cenerg.in

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CENERG, established in 2012, has grown to be a leading Rotary Drill Bit manufacturer based at Hyderabad – India. With an output of around 2500 bits per month, **CENERG** serves a strong customer base spread across 20 countries.

CENERG range of Rotary Drill Bits cover Blasthole, Water well, Construction, Raise boring, Exploration and Horizontal Directional Drilling Applications. Bit sizes range from 2 3/8" to 17 ½" in Milled Tooth and Tungsten Carbide Insert types.

Customer's unique drilling challenges call for special solutions. **CENERG** is well equipped to respond to these challenges from its wide range of products with short delivery times.

CENERG product development activity is aligned with evolving drill rig developments suiting autonomous drilling machines by providing reliable and high performing Rotary Drill Bits.

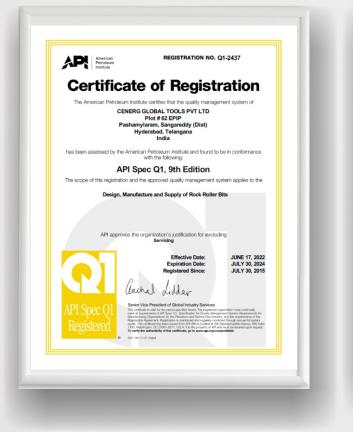
Our Vision

Our Mission

Make rock drilling Reliable, Affordable and Smooth for our Customers Focus on continual innovation of products to meet unique customer challenges.

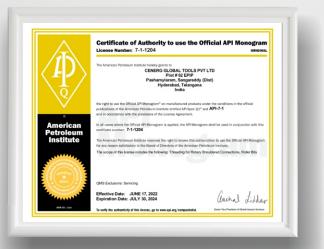












CENERG is spread across a 9000 square meter manufacturing facility and has the latest CNC Machines, Automated Heat Treatment Furnaces, Metallurgical labs, Inspection & Testing Machines.

In addition to ISO9001: 2015, API Spec 7-1 certifications, **CENERG** rotary drill bit facility in India is certified by American Petroleum Institute for quality management system conforming to API Q1.

CENERG has a strong leadership that guides a team of 300+ skilled employees working relentlessly to deliver the best in class products.

CENERG believes in workplace safety and reduction of incidents by investing in safety equipment and continuous training of personnel.

Emerging technologies like robotics and automation are used to enhance Safety, Reliability and Productivity.







We shall strive to achieve customer delight with respect to Quality, Timely Delivery & Dependability of our products.

We are committed to continually improve our performance with a team of dedicated professionals in all aspects of our business.

We are committed to comply with requirements & continually improve effectiveness of Quality Management System .

Bearing Types

Open bearing – Air Circulation

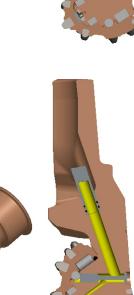
In this configuration an air passage is provided to the bearing area. The compressed air cools and lubricates the bearings and blows away any drilling debris extending the life of the bearing. This bearing configuration is commonly used in Blasthole Mining applications

Open bearing - Air, Mud or Foam Circulation

The standard open roller bearings are without a seal or an air passage. They are ideal for drilling shallow holes, in the hundreds of feet with either foam or mud circulation. These bearing configurations are commonly used in Water Well applications.

Semi-Sealed bearing – Air Circulation

Semi-Sealed bearings for air circulation are similar to Open Air bearings, only difference being the bearing pack protected with an O- Ring Seal. The lubricant is filled into the bearing and sealed off. This prevents ingress of dirt into the bearing system and leakage of grease. This configuration is used for Mining applications with heavy water injection and ground water conditions.



Bearing Types

Sealed Journal bearing - Air & Mud circulation In Sealed Journal bearing the Rollers inside the cone are replaced by a Floating Bush made out of special alloys which is silver plated. The bearing Pack is protected with an O-Ring Seal. The bearing lubrication and pressure compensator system is built in. The Floating Bush is highly resistant to heat and galling. Consequently these bearings are very durable and suitable for Mining, Raise Boring, HDD applications **Sealed friction bearing - Mud circulation** In bearings for Small Diameter Bits instead of the Floating Bush the internal surface of the Cone is silver plated using

a special process. This design enables bearing size to be increased in relation to the diameter of the Bit enhancing its durability. This bearing design finds application in Reverse circulation and Waterwell drilling applications

Sealed roller bearing – Air & Mud Circulation

While sealed roller bearings have some of the features of Open to Air bearings, the bearing pack is protected with an O- Ring Seal and has lubrication and pressure compensator system built in. This prevents ingress of dirt into the bearing system and leakage of grease. This configuration is used for Mining, Exploration applications





Air to Bearing Bit features

Sealed Bearing Bit features

The cutting structure on the bits is optimized with intermittent pitch breaks for efficient rock breakage and to reduce vibration

Customizable gage protection options for maximum endurance



Double gage protection for very abrasive drilling conditions



Single gage protection for normal non-abrasive drilling conditions

Special features provided for cone steel erosion when drilling is abrasive formations.



Hard metal on nose area of cones to avoid coring while drilling

**Customizable shirttail protection options for maximum endurance

The teeth are long, strong, widely spaced with intermittent deletions to permit deep penetration in the formation with comparatively light weight on bit

Grease compensator to maintain pressure inside the bearing and improve lubrication





1/3rd shirttail protection for non abrasive drilling



2/3rd shirttail protection for medium hard and moderately abrasive drilling



Full shirttail protection for very hard and very abrasive drilling

Nozzles with Threaded and Nail retention options depending on the application







CN 25 - CN 31 Series Very Soft Formation Rotary Drill Bits

Design features: Large diameter and widely spaced chisel or sharp conical carbide insert with high projection. Small flat inserts placed in between, on gage and inner rows to prevent cone shell erosion. Laser hard faced spot deposits to arrest steel erosion. Additional flush space on shirttail for quick evacuation of cuttings.





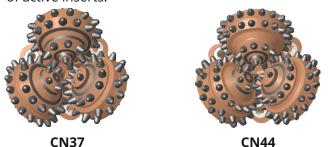


Benefits: Vibration free drilling resulting in maimum penetration rates in very soft formation.

Applications: suitable for Sand, Mudstone, Sandstone type sedimentary formations with low compressive strenghs of 20 to 60 Mpa

CN 37 - CN 44 Series Soft Formation Rotary Drill Bits

Design features: Large diameter and widely spaced chisel or sharp conical carbide inserts with high projection. Small flat inserts placed in between, on gage and inner rows to prevent cone shell erosion. Hard faced cone shell to delay erosion and exposure of active inserts.



Benefits: High penetration rates in soft formation along with vibration free drilling.

Applications: Suitable for Shale, Lime stone, Sandstone, Gravel - Soft formations with compressive strengths of 50 to 110 Mpa.

Benefits: Good penetration rates

and moderately abrasive formation.

Applications: Suitable for Granite,

formations with Compressive Strengths of 90 - 150 Mpa.

Marble, Hard Sandstone - Medium Hard

and longer life in medium hard

Longer bearing due to Smooth Drilling.

CN50 - CN 60 Series Medium Hard Formation Rotary Drill Bits

Design features: Moderately spaced conical inserts with medium projection. Doublerow gage protection inserts. Hard metal deposit on nose area to protect against cone shell erosion.



CN54



CN60

CN74 CN80

Milled Tooth - Soft, Medium and Hard Formation

Design features: Aggressive and robust teeth with Tungsten carbide hard facing for extended

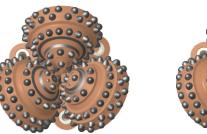




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CN 64 – CN70 Hard Formation Rotary Drill Bits

Design features: Closely spaced conical or sph Inserts with medium to low projection. Hard metal deposit on nose area to protect ag cone shell erosion.



CN64

CN73

CN 74 - CN 80 Very Hard Formation Rotary

Design features: Closely spaced conical or spherical medium to low projection crack resi carbide Inserts. Load balanced layout of inser

bherical against	Benefits: Good penetration rates in hard, consolidated and very abrasive formation. Longer bearing due to Smooth Drilling
	Applications: Suitable for Dolomite, Granodiorite, Quartzite, Magnetite, Banded Hematite Quartzite. Formation of 150 to 250 Mpa. and banded iron and abrasive consolidated formations with compressive strengths of above 200 Mpa.
/ Drill Bits	
sistant tough erts	Benefits: Stable penetration rates in very abrasive formation. Longer bearing life due to smooth drilling.
- Constant	Applications: Quartzite, Taconite, Banded Iron. Very hard grade formations of 260 to 400 Mpa

n protected ded performance	Benefits: Good penetration rates in unconsolidated and unfavourable
	rock conditions Applications: Clay, Sand, Sandstone, Gravel, Silt stone, Mud Stone formations
	Compressive strengths upto 100 Mpa

CN33

Product offering

Product offering

Blasthole Mining Application

Blasthole Mining Application

Blasthole Mining Application

Waterwell Application

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 | 7-4 | Open bearing
– Air Circulation | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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 | 7-4 | Sealed Bearing
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pilot bits & Bit thirds	Inch	mm	5-3	6-3	7-3	8-3	Ir
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bore,	11"	284		✓		\checkmark	
e b	12 1/4"	311	✓	\checkmark	\checkmark	\checkmark	Note
Raise	12 7/8"	327				\checkmark	IADC
Rŝ	13 3/4"	349		\checkmark		\checkmark	mari

Note: Send enquiry with size, IADC & Application details to marketing@cenerg.in Open bearing - Air, Mud or Foam Circulation

meter IA	DC X	- X -	7	
mm	5-3	6-3	7-3	8-3
375		\checkmark		\checkmark
381				✓
406				\checkmark
445				✓
	mm 375 381 406	mm 5-3 375 381 406	mm 5-3 6-3 375 ✓ 381 ✓ 406 ✓	375 ✓ 381 ✓ 406 ✓

Sealed bearing - Mud Circulation

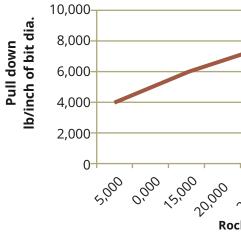
Pull Down & Rotation

Useful Operating Information

- When a new bit is installed, drill at reduced weight for 30 minutes
- Select the correct nozzle size to provide adequate air to the bit for optimal bearing performance and reduced abrasion wear on cones & shirttails. (Recommended 40 – 45 psi at the bit checked with U tube gage)
- Turn the air on before lowering the bit to collar the hole. Continue to keep the air on until the bit finishes drilling and is out of the hole.
- Rotate the bit when moving in and out of the hole.
- Rotating the bit when moving out of the hole
 - Helps in cleaning the cuttings from the hole.
 - Prevents the cuttings from entering the bearings.
- Indications that the hole is not being properly cleaned are:
 - Increase in torque/ higher hydraulic pressure.
 - Increase in air pressure.
 - Heavy wear / damage on shirttails.
- Do not use the hydraulic pressure on the bit for leveling the machine
- When adding extra drill pipe in wet holes, run three or four clean passes to get a cleaner hole bottom.
- Bit cones should be checked periodically for temperature. An odd hot cone indicates that the air passage to the bearing is being obstructed. Clean this cone with water.
- When repairs require lowering of the head assembly to the deck, Bit should never be left down the hole.
- Also the bit should be substituted by a dull bit to protect the drill pipe threads.
- Drill pipe and its threaded connections should be maintained properly as a bent pipe will often lead to early failure.
- Blasthole bits drill most economically when sufficient weight is applied to cause fracture of the formation.
- Selecting correct rotary speed is a matter of trial and error, depends upon the formation being drilled.
- Alternatively use the factory recommended weight and rotation speeds.
- It is necessary to make an analysis of each discarded bit for dulling and its causes These findings help in determining the suitable bit design features for the application.

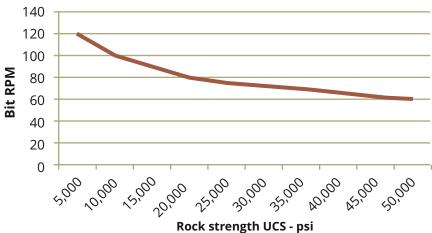
Pull down load is required to adequately push teeth into the rock to break in efficiently. It is the primary factor in rate of penetration. The unconfined compressive strength of the rock determines how much pull down is to be applied.

High UCS rocks may need time for the indenter to break it. Lower RPM is often required for efficient rock breakage.



Rotation is required to move the cutting teeth to the next rock cutting position. The faster you move the teeth to the next position, the faster you will drill. If the rock resists indentation by the teeth, there will be minimal rock breakage, and rate of penetration will not increase proportionally with higher rotation.

For softer rock high RPM is required as Soft rock responds to frequency and for harder rock low RPM is required as Hard rock responds to time



25,000 30,00 35,000 40,000 45,000 50,00

Pull down

Rock strength UCS - psi

RPM

Air Requirements

Nozzle Selection Table

In rotary blasthole drilling, delivery of air in sufficient volume and at proper pressure is very essential to assure optimum bit performance.

Right amount of air ensures efficient cuttings removal from the hole bottom to the surface. It also reduces the cutting structure wear and bearing erosive wear by means of efficient bottom hole cleaning.

The right amount of back pressure is also required to cool the bearing and to keep the bearing clean from drilling debris.

The air volume provided must be good enough to produce a bailing velocity of 5,000-7,000 ft./min. for dry cuttings; and 7,000-10,000 ft./min. for wet cuttings.

To determine volumetric requirements, and bailing velocity the simple equation may be used.

$Q = V/183.35 (D^2 - d^2)$

Q = cubic feet per minute of free air.

- V = Annular Velocity feet / min
- d = drill pipe outside diameter, inches.

D = hole diameter, inches.

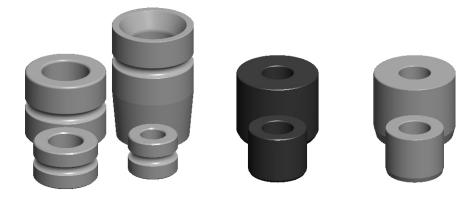
183.35 = Factor for conversion

Hence to determine the bailing velocity the equations is

 $V = Q \times 183.35 / (D^2 - d^2)$ feet per min

Nozzle selection

Nozzles should be selected so that the pressure inside the bit is 40-45 psi. The cab operating pressure inside the drills cabin could be higher, depending on the type of drill and CFM of air circulated. Typically, on compressors rated with 80-100 psi bit pressures can be 10 - 25 psi lower than the cab gauge reading.



Thread								ī	-	:	Z .	NOZZLE SELECTION	SELECTIO	NO :	-	-						
connection	Nozzle size				Air Pre	Air Pressure drop across Blast-hole bits with various nozzle size. Air volume delivered - CFM (cubic feet per minute)	rop acr	oss Bla	st-hole	bits wi	th vario	zou sn	rle size.	Air vol	ume di	elivered	- CFM (cubic fe	et per r	minute)		
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2 7/8"	10 mm	47	59	71																		
ઍ	11 mm	35	45	55	99	75																
3 ½"	12.7 mm	26	34	42	50	58	66	74														
	14 mm	18	24	31	38	44	58	58	64 7	71												
	8 mm	52	62	72	81																	
	10 mm	43	51	61	69	78																
3 ½"	11 mm	34	41	48	57	65	73	79														
	12.7 mm	29	33	41	48	54	61	67	73 7	79												
	14 mm	23	29	34	41	47	51	56	62 6	67	73 79	6										
	10 mm	35	44	54	65	74	82															
	11 mm	29	36	43	50	56	64	70	76 8	82												
	12.7 mm	22	26	32	38	44	50	58	66 7	75 8	83											
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	16 mm			20	25	30	35	41	46 5	51	56 64	4 68	3 72	78								
	17.5 mm				22	26	30	35	40 4	45 5	51 56	6 61	66	72	78							
	19 mm					20	24	28	33 3	36 2	40 46	6 50	54	59	64	69	74	78				
	10 mm	35	45	53	61	69	76															
	11 mm	28	36	43	51	59	66	73	80													
	12.7 mm	20	26	32	38	44	52	59	65 7	20	76											
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	25 mm										20 22	2 22	24	27	29	32	34	37	39	41	46	51 56
	10 mm		18	24	29	34	40	45	52 5	57 6	62 68	8 74										
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