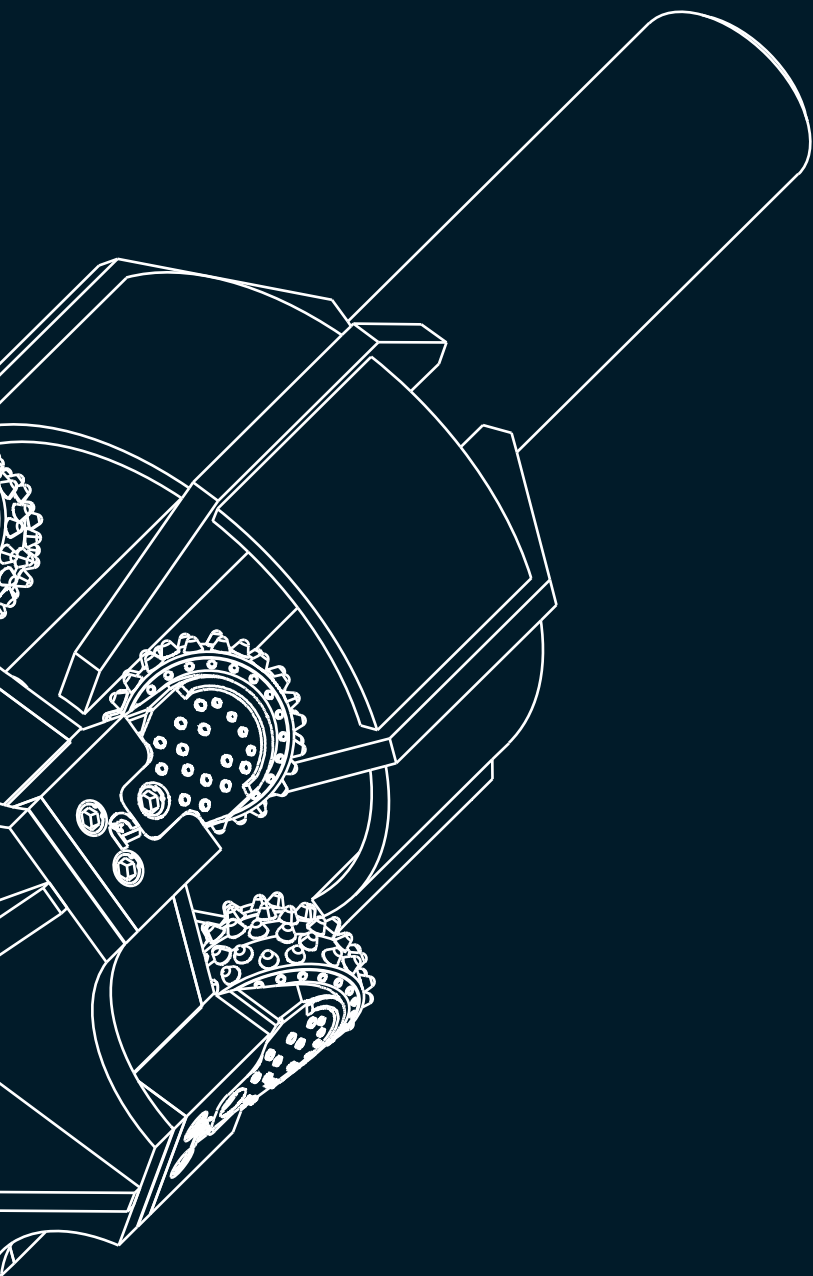




ENGINEERING SUPPORT

BUILT AROUND THE APPLICATION.

DRILLNOVA is the trenchless tooling brand of FIRMTECH, focused on pilot-hole drilling, rock reaming and soil reaming tools for horizontal directional drilling.

PRACTICAL TOOLING. CLEAR TECHNICAL HANDOFF.

Our range includes PDC and tricone pilot bits, roller cone hole openers, PDC reamers, soil reamers, pulling tools, wear parts and customized trenchless components.

Selection is based on the rig, bore geometry, formation strength and abrasivity, fluid system and required final hole size.



APPLICATION REVIEW

Formation, bore geometry, rig and return conditions.



CUSTOM TOOL DESIGN

Diameter, cutting structure, connection and serviceability.



INSPECTION & TRACEABILITY

Material, dimensions, welds, runout and final records.

CONFIRM BEFORE PRODUCTION

Tool diameter

Stabilizer / fluid layout

Pin / Box connection

Inspection scope

Cutting structure

Delivery requirement

CHOOSE THE RIGHT TOOL FOR THE GROUND.

Ground behavior leads the choice. UCS is one input—not a universal PDC / TCI boundary.

SOIL	MIXED GROUND	ROCK	BEHAVIOR FIRST - UCS SECOND			
GROUND CONDITION	FIRST-CHOICE TOOL	ALTERNATIVE	AVOID / NOTES			
Soft cohesive soil / clay	Paddle / mixing reamer	Barrel or fluted reamer	Check balling, swelling, fluid compatibility and cuttings return.			
Dense soil / compacted clay / hardpan	Carbide fly cutter or fluted reamer	Multi-stage reamer	Check packing, inclusions, cutter wear and spoil-flow area.			
Sand / fine gravel / stable granular ground	Barrel or fluted reamer	Fly cutter or multi-stage reamer	Check bore stability, particle size and loss of returns.			
Cobbles / boulders / highly variable mixed ground	TCI roller-cone hole opener	Project-specific cobble / hybrid tool	Standard PDC and soil reamers are not default choices.			
Competent, reasonably homogeneous rock	PDC pilot bit / PDC reamer	Tricone / TCI hole opener	Check quartz content, abrasivity, cooling and cuttings return.			
Fractured / interbedded / highly variable rock	Tricone / TCI hole opener	Impact-resistant or hybrid PDC by review	Check shock loading, bedding changes and circulation losses.			
Very strong and/or highly abrasive rock	Hard-formation TCI or engineered hard-rock PDC	Project-specific system	Confirm mineralogy, abrasivity, discontinuities and rig/tool limits.			

UCS DESCRIPTION (REFERENCE ONLY)	Very weak 1-5	Weak 5-25	Medium strong 25-50	Strong 50-100	Very strong 100-250	Extremely strong >250 MPa
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ONE ROCK NAME IS NOT ENOUGH.

Confirm UCS, abrasivity, fracture condition, inclusions and impact risk.

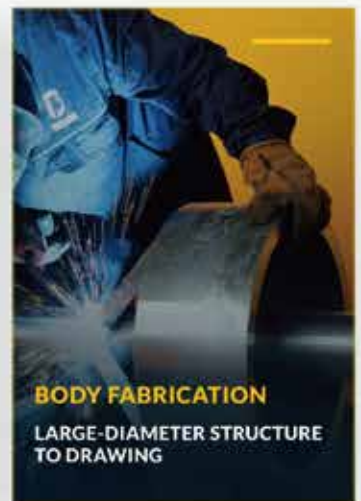


APPLICATION-SPECIFIC OPERATING WINDOW.

WOB, RPM, flow and pass planning are issued with the confirmed specification.

FROM APPLICATION REVIEW TO FINAL INSPECTION.

The delivered tool must match the approved drawing, connection, cutter arrangement and order specification.



APPLICATION REVIEW

Ground, rig, bore profile, final diameter and fluid return



DRAWING & CONNECTION

Cutting structure, stabilizer, Pin / Box and overall geometry



CONTROLLED PRODUCTION

Machining, welding, hardfacing, assembly and finishing



FINAL INSPECTION

Dimensions, visible workmanship, connection and configuration



EVIDENCE BEFORE CLAIMS. Certification marks, material grades, serial traceability or inspection percentages appear only when supporting documents are available for the order.

Tricone Bit

NovaPilot™ Series Tricone bits are purpose-built for Horizontal Directional Drilling (HDD) operations. Engineered to deliver smooth guidance, rapid penetration, and extended durability, these bits perform exceptionally across diverse ground formations—from soft soils to abrasive rock layers.



TCI Bit

Size: 5.5", 6", 6.5", 7.875", 8.5"

IADC Range: 517 / 537 / 617 / 637

Bearing Type: Rubber & Metal sealed journal bearing

Recommended WOB (kN/mm): 0.37-1.2

Recommended RPM: 40-140

Applicable Formations:

- Shale & Limestone
- Sandstone
- Quartz-rich formations- Granite
- Basalt, and other high-strength igneous rocks



Milled Tooth

Size: 5.5", 6", 6.5", 7.875", 8.5"

IADC Range: 117 / 127 / 217

Bearing Type: Rubber sealed journal bearing

Recommended WOB (kN/mm): 0.35-1.2

Recommended RPM: 50-180

Applicable Formations:

- Clay, Mudstone
- Chalk, Shale,
- Limestone & Sandstone

DRILL RIG	HOUSING OPTIONS	BIT SIZE	PIN SIZE
JT2720AT	w/ 3.75" dia. Rockmaster® housing	4 3/4" – 5"	2 7/8" Reg.
JT2720AT	w/ 4.75" dia. Rockmaster® housing	5 1/2"	2 7/8" Reg.
JT30AT	w/ 3.75" dia. Rockmaster® housing	4 3/4" – 5"	2 7/8" Reg.
JT30AT	w/ 4.75" dia. Rockmaster® housing	5 1/2"	2 7/8" Reg.
JT3020AT	w/ 3.75" dia. Rockmaster® housing	4 3/4" – 5"	2 7/8" Reg.
JT3020AT	w/ 4.75" dia. Rockmaster® housing	5 1/2"	2 7/8" Reg.
JT4020AT	w/ 5" dia. Rockmaster® housing	6" – 6 1/2"	3 1/2" Reg.
JT60AT	w/ 5" dia. Rockmaster® housing	6" – 6 1/2"	3 1/2" Reg.
JT100AT	w/ 5" dia. Rockmaster® housing	6" – 6 1/2"	3 1/2" Reg.
D36X50DR		6" – 6 1/2"	3 1/2" Reg.

PDC Bit

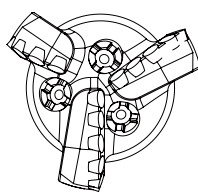
NovaPilot™ Series PDC bits redefine pilot-hole drilling efficiency. Built for soft to medium formations, they combine **precision engineering** with **durable PDC cutters** to deliver **high ROP, superior steering response, and long service life**.

In comparative field results, **NovaPilot™ drills up to four times faster** than traditional tricone bits in **sandstone, shale, and limestone**, cutting **downtime and overall project cost** across trenchless HDD operations.

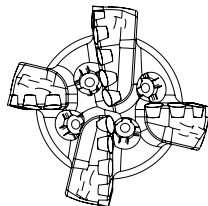


Why Choose Drillnova PDC Bits?

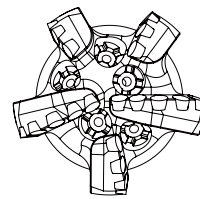
- **Optimized for HDD rigs** – Compatible with Vermeer, Ditch Witch, Tracto and others
- **Blade options** – 3 to 6 blade configurations



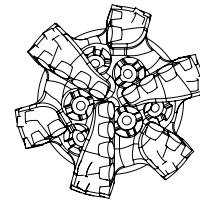
3-Blade



4-Blade



5-Blade



6-Blade

- **Durable cutters** – Cutter sizes 13mm, 16mm, 19mm, high-grade for extended life in abrasive formations
- **Hard-Facing**



- *40% higher carbide density*
- *Longer hours in abrasive formations*
- *Reduces Lost Cutters & Ring Out*

- **Compact short shank** – Enhanced directional control



Better steering performance in HDD rigs

Short Shank

Technical Parameters & Drilling Settings

Popular Spec. For HDD

Size (in)	Cutter Size	Blade	Pin Connection	Rig Compatibility
5-1/2"	1313	4/5	2-7/8" API Reg	JT2720AT/JT30AT/JT3020AT/D23x30DR S3/ACS130
6"	1313	4/5	3-1/2" API Reg	JT4020/JT60AT/JT100AT/D36X50DR/18ACS/20ACS/ACS300
6-1/2"	1313	4/5	3-1/2" API Reg	JT4020/JT60AT/JT100AT/D36X50DR/18ACS/20ACS/ACS300

Other sizes & API connections available upon request, from 89mm to Maximum 700mm

Recommended Weight & RPM Settings

Size (in)	Blade	Thrust (ton)	RPM	Mud Flow (L/min)	Typical Ground
5-1/2"	4	Up to 4	120-280	70-90	Clay, soft sandstone
6-1/2"	5	Up to 4	120-280	70-90	Medium sandstone, shells

Additional Notes from Field for using PDC bit:

- 200–300 RPM for most HDD rigs
- Torque monitoring is essential –if torque spikes & ROP drops →rock too hard→stop
- 4-blade bit, Very aggressive on hard clay / soft rock, 6-blade is slower, smaller chips – not ideal in toughrock for HDD
- PDC not recommended for granite, quartzite, high-silica ironstone or very hard basalt– use roller bits in those cases



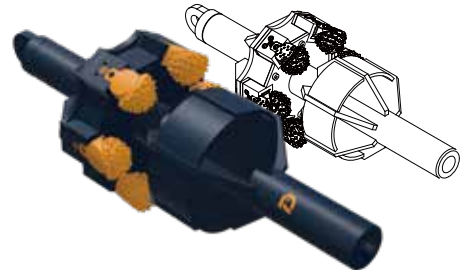
Have Questions ?

Talk directly with our drilling engineer.



Bolt-On Hole Opener

NovaForce™ B Bolt-on hole opener are designed for contractors who need maximum on-site flexibility. With a bolt-on replaceable cone system, operators can easily swap out different cone types--chisel, conical, or spherical--directly on the jobsite to adapt to changing ground conditions.



Specifications

- **Hole Opener Dia.:** 12" - 48"
- **Cutter Types:** Bolt-on type for fast field maintenance
- **Cone Sizes:** MH-7R, MH-3R, 12MH-3R
- **Thread:** API REG / IF / NC threads available
- **Soil Condition:** Ideal for reaming soft to hard formations

OD Size	Roller Bit Size Recommended	Rollers No. Recommended
12"	MH-7R	3
14"	MH-3R	4
16"	MH-3R	4
18"	MH-3R	5
20"	MH-3R	6
22"	12MH-3R	4
24"	12MH-3R	4
26"	12MH-3R	5
28"	12MH-3R	6
30"	12MH-3R	6
32"	12MH-3R	7
34"	12MH-3R	7
36"	12MH-3R	8
38"	12MH-3R	9



Replaceable Cutter

Drillnova **Replaceable Cutter** is engineered for high-efficiency field maintenance in HDD and Microtunneling reaming projects.

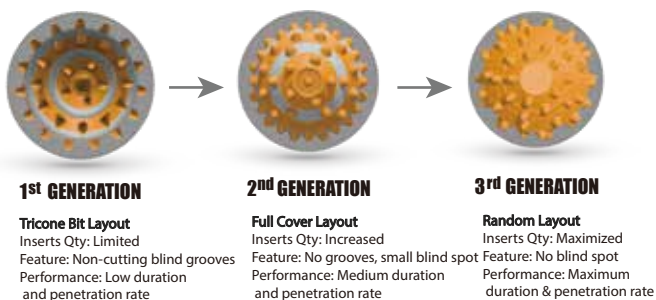
Each cutter uses a refined insert layout, tailored for directional drilling—minimizing vibration, enhancing steering precision, and increasing ROP across soft to hard formations.



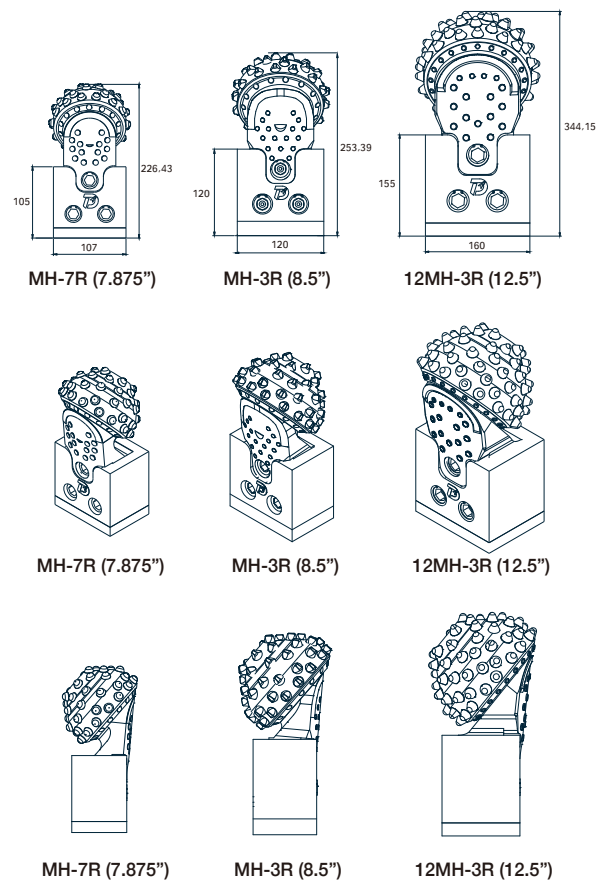
Featuring a Slot pocket & 3-bolt + spring-lock design, it enables secure and fast cutter replacement without welding, reducing downtime and labor on site.

Available Cone Sizes & Configurations

Design Revolution



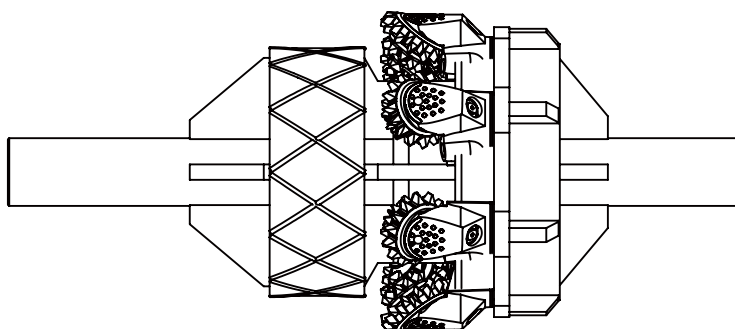
Select Cone Design



Fixed Type Hole Opener

NovaForce™ F– Fixed Type Hole Opener is built with a fully welded arm-body structure for maximum strength and simplicity. Designed for cost-effective HDD reaming, it eliminates the need for bolt-on components—ideal for one-pass operations or single-use projects in medium to hard formations.

Equipped with high-quality TCI cones and a solid steel frame, this tool is optimized for straight-line reaming, low maintenance, and stable torque transfer.



Tricone Roller Cutter

- Welded cone cutter offering high load-bearing capacity and secure welded attachment. They are commonly installed as integrated units, featuring a variety of tooth types to suit different rock strengths.

- Cone Cutter Structure**

Steel Tooth: Suitable for soft to medium formations

TCI (Tungsten Carbide Insert): Suitable for medium to hard rock formations

- Sealing Options:** Metal/Rubber seal
- Cone Size Range:** 5.5" 6" 8.5" 12.25" 13.875"
- OD Size:** 200 mm to 1800 mm
- IADC Code:** 517 / 537 / 617 / 637 / 737



OD Size	Roller Bit Size Recommended	Rollers No. Recommended
8"	5-7/8"	3
10"	6"	3
12"	8-1/2"	3
14"	8-1/2"	4
16"	8-1/2"	4
18"	8-1/2"	5
20"	9-7/8"	4
22"	9-7/8"	5
24"	9-7/8"	6
26"	12-1/4"	5
28"	12-1/4"	6
30"	12-1/4"	6
32"	12-1/4"	7
34"	12-1/4"	7
36"	12-1/4"	8
38"	13-5/8"	8
40"	13-5/8"	9

Fixed Type PDC Reamer

Novacut™ F is a solid-body PDC reamer engineered for maximum durability and fast penetration in HDD applications.

With a fixed blades, it offers zero-maintenance performance and is ideal for contractors seeking a simple, robust solution for single-pass or long-distance reaming in abrasive and consolidated formations.

Made from 42CrMo alloy steel (Tempered) and equipped with premium polycrystalline diamond cutters, it excels in sandstone, shale, limestone, and similar formations, No moving parts. Just cut, clean, and finish.

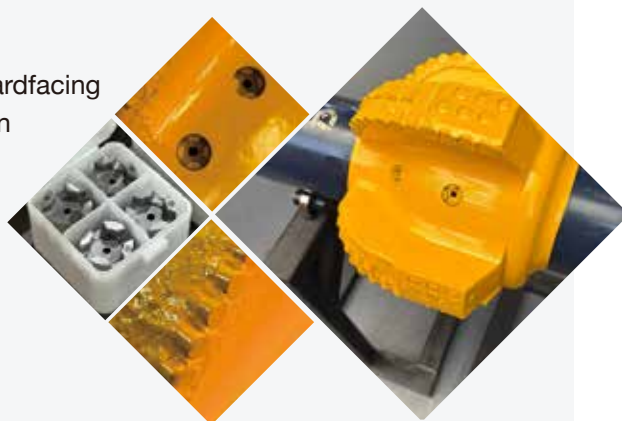
Rugged Simplicity. Extended Tool Life. High-Speed Cutting.

Key Features

- One-piece solid body
- Available in 3–7 blade designs
- Longer tool life with premium steel + wear-resistant hardfacing
- Jetting ports optional for improved cuttings evacuation
- One-pass large diameter expansion

“Bolt-On PDC Reamer helped us finish a 500m HDD bore in shale two days ahead of schedule.”

— HDD Contractor, Australia



Spec Item	Details
Size Range	8"-36"
Blade Count	3/4/5/6/7
Cutter Sizes	13/16/19mm
Connection	API REG/IF/NC (customizable)



Built to last. Cut once, cut right.

Bolt-On PDC Reamer

Novacut™ B is a modular PDC reamer featuring a bolt-on blade system, purpose-built for horizontal directional drilling (HDD) projects that demand flexibility, fast turnaround, and long tool life.

Replace blades, not your reamer.

The Novacut™ B modular body allows contractors to change worn blades directly on-site using basic tools — no welding, no waiting. Its reusable steel body paired with premium diamond PDC blades ensures superior cutting performance in abrasive and medium-hard formations while reducing spare inventory and downtime.

Replace blades, not your reamer.

Key Features

- Swap blades on site – no need to return full body
- Compatible with multiple blade sizes
- Reduced spare inventory and extended tool lifecycle
- Bolt-on structure with anti-loosening lock system

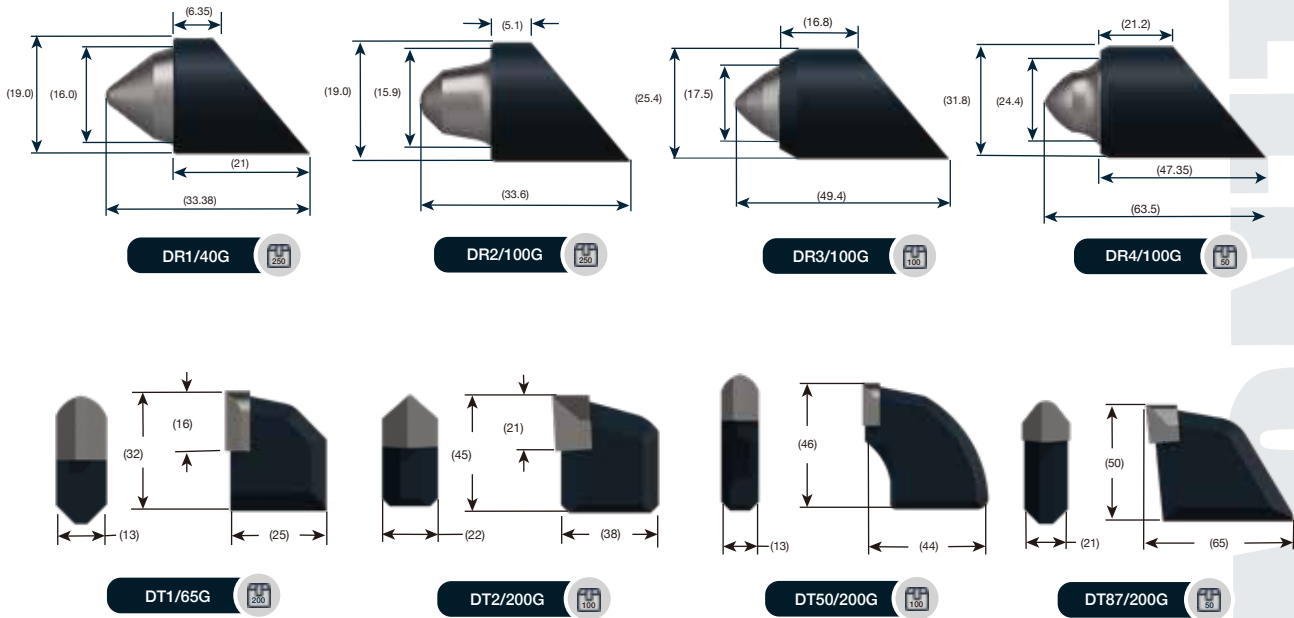
Efficient maintenance + reduced downtime = more profit per meter.

Spec Item	Details
Size Range	8"–36"
Blade Count	3 / 4 / 5 / 6 / 7
Cutter Sizes	13 / 16 / 19 mm
Blade Type	Bolt-on PDC blade (single / double-row)
Connection	API REG / IF / NC (customizable)



Novacut™ B – Your modular reaming solution.

Weld-on Teeth



unit:mm

Other HDD & Microtunneling Tools



Microtunneling Drill Head



PDC Cone Bit



Rock roller Head



Auger Flight



Drill Rod Pin



Pulling Eye

BARREL REAMER

Bore conditioning and a stable, full-diameter profile in suitable soil.

APPLICATION

The long body supports bore stability while carbide cutters, fluid ports and wear protection assist cutting and spoil movement.

FORMATION WINDOW

----- SANDY LOAM → STABLE MEDIUM SOIL -----

CONFIGURATION OPTIONS

PULLING EYE	RATED SWIVEL INTERFACE	CARBIDE CUTTERS	CUSTOM SIZE
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FULL BODY

Long barrel geometry supports a round profile.



SOIL WINDOW

Sandy loam, loam, loamy clay and stable medium soil.



WEAR PROTECTION

Cutter and hardfacing layout follow wear zones.



REAR OPTIONS

Pulling eye or integrated swivel.

CORE SPECIFICATIONS

CONFIGURATION OVERVIEW · APPLICATION REVIEW REQUIRED

DIAMETER	BODY LENGTH	FRONT CONNECTION	REAR OPTION
8–48 in / 200–1,200 mm	By diameter	Box by rig / tool string	Pulling eye / rated swivel interface
Larger custom sizes	Application-specific	Confirmed at order	Confirmed at order

FORMATION RECOMMENDATION GUIDE

✓ RECOMMENDED	ⓘ USE WITH CAUTION	✗ NOT RECOMMENDED
- Sandy loam - Loam and loamy clay - Stable medium soil	- Fine gravel - Unstable running ground - High packing tendency	- Large cobbles - Competent hard rock - Running sand without review



Operating parameters and pass planning are supplied with the confirmed tool specification.



Review rig, bore geometry, strength, abrasivity, fluid system and cuttings return.

FLY CUTTER REAMER

Open-body cutting, mixing and spoil movement with replaceable carbide cutters.

APPLICATION

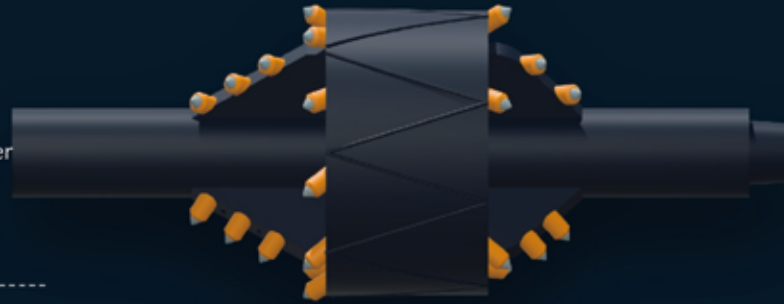
An open frame provides flow area. Forward and reverse carbide cutter positions support aggressive cutting and conditioning.

FORMATION WINDOW

----- COMPACTED SOIL → SELECTED WEATHERED ROCK -----

CONFIGURATION OPTIONS

FORWARD CUTTERS	REVERSE CUTTERS	OPEN FRAME	CUSTOM SIZE
-----------------	-----------------	------------	-------------



OPEN FACE

High flow area supports spoil movement.



CARBIDE CUTTERS

Replaceable cutters follow expected wear.



LOW-MASS BODY

Open structure compared with a barrel.



TWO-WAY CUTTING

Forward and reverse cutter options.

CORE SPECIFICATIONS

CONFIGURATION OVERVIEW · APPLICATION REVIEW REQUIRED

DIAMETER	CUTTING SYSTEM	BODY	CONNECTION
8–36 in / 200–900 mm	Replaceable carbide	Open welded frame	By tool string
Larger sizes by application	Layout by formation	Wear protection by application	Pin / Box confirmed at order

FORMATION RECOMMENDATION GUIDE

✓ RECOMMENDED	ⓘ USE WITH CAUTION	✗ NOT RECOMMENDED
- Compacted soil / hardpan - Sandy loam - Selected weathered rock	- Cemented inclusions - Coarse aggregate - Abrupt impact loading	- Competent hard rock without review - Repeated high-impact loading - Large intact boulders



Operating parameters and pass planning are supplied with the confirmed tool specification.



Review rig, bore geometry, strength, abrasivity, fluid system and cuttings return.

MULTI-STAGE REAMER

Progressive cutting rows distribute load and create deep spoil-evacuation channels.

APPLICATION

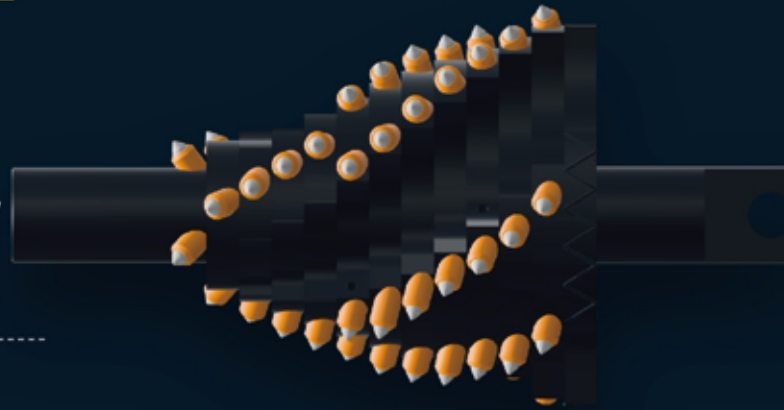
The staged profile reduces the formation engaged by each cutter row compared with a single flat cutting face.

FORMATION WINDOW

----- COMPACTED CLAY → WEATHERED SOFT ROCK -----

CONFIGURATION OPTIONS

PROGRESSIVE ROWS	DEEP CHANNELS	CARBIDE CUTTERS	WEAR ZONES
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STAGED CUTTING

Progressive rows distribute engagement.



MIXED GROUND

For hardpan and controlled gravelly ground.



REINFORCED BODY

Protected high-wear areas.



REPLACEABLE CUTTERS

Carbide cutters support service.

CORE SPECIFICATIONS

CONFIGURATION OVERVIEW · APPLICATION REVIEW REQUIRED

DIAMETER	CUTTER ROWS	BODY	CONNECTION
8–48 in / 200–1,200 mm	Progressive multi-stage	Welded body by approved drawing	By tool string
Exact configuration by order	Quantity by diameter	Hardfacing on wear zones	Pin / Box confirmed at order

FORMATION RECOMMENDATION GUIDE

✓ RECOMMENDED	ⓘ USE WITH CAUTION	✗ NOT RECOMMENDED
- Compacted clay / hardpan - Controlled gravelly ground - Weathered soft rock	- Large particles - Unstable wall - Abrupt hard bands	- Competent hard rock - Primary wall-stabilization duty - Uncontrolled large cobbles



Operating parameters and pass planning are supplied with the confirmed tool specification.



Review rig, bore geometry, strength, abrasivity, fluid system and cuttings return.

FLUTED REAMER

Helical spoil channels support cutting, mixing and spoil transport while maintaining bore diameter.

APPLICATION

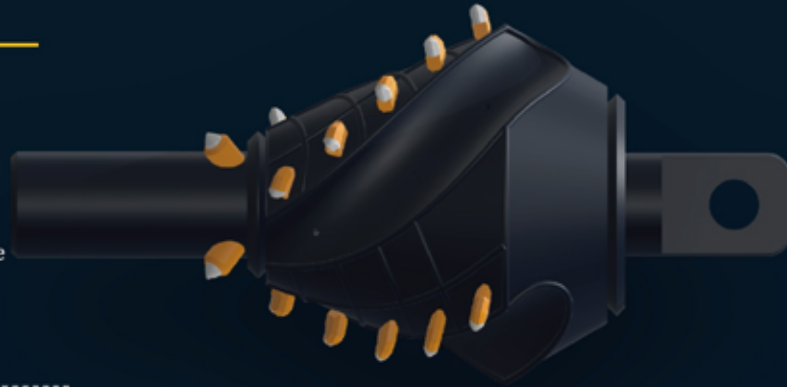
A tapered body, helical flutes, carbide cutters and fluid ports create continuous flow paths while maintaining diameter.

FORMATION WINDOW

----- CLAY → SOIL WITH FINE GRAVEL -----

CONFIGURATION OPTIONS

HELICAL FLUTES	FLUID PORTS	CARBIDE CUTTERS	REVERSE CUTTERS
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CONTINUOUS CHANNELS

Helical flutes provide a spoil path.



SPOIL TRANSPORT

Helical channels support mixing and spoil movement.



FULL-BODY PROFILE

Supports a consistent diameter.



BALANCED CUTTERS

Placement helps reduce uneven loading.

CORE SPECIFICATIONS

CONFIGURATION OVERVIEW · APPLICATION REVIEW REQUIRED

DIAMETER	BODY PROFILE	CUTTING SYSTEM	CONNECTION
8–40 in / 200–1,000 mm	Tapered fluted body	Carbide cutters	By tool string
Larger custom sizes	Application-specific	Forward / reverse	Pin / Box confirmed at order

FORMATION RECOMMENDATION GUIDE

✓ RECOMMENDED	ⓘ USE WITH CAUTION	✗ NOT RECOMMENDED
- Clay and loamy clay - Compacted soil / hardpan - Fine gravel	- Packing tendency - Larger aggregate - Limited return	- Large cobbles - Competent hard rock - Restricted spoil return



Operating parameters and pass planning are supplied with the confirmed tool specification.



Review rig, bore geometry, strength, abrasivity, fluid system and cuttings return.

PADDLE REAMER

Open-body cutting and mixing for cohesive and reactive soil.

APPLICATION

Paddle geometry creates mixing space while fluid ports help control buildup before product installation.

FORMATION WINDOW

----- SILT / CLAY → COHESIVE SAND MIX -----

CONFIGURATION OPTIONS

OPEN BODY	PADDLE MIXING	FLUID DISTRIBUTION	CARBIDE CUTTERS
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SOIL MIXING

Open paddles cut and condition cohesive soil.



COHESIVE GROUND

For silt, clay, loam and backfill.



BUILDUP CONTROL

Open flow area helps manage clay.



REPLACEABLE CUTTERS

Carbide cutters support service.

CORE SPECIFICATIONS

CONFIGURATION OVERVIEW · APPLICATION REVIEW REQUIRED

DIAMETER	BODY	CUTTERS	CONNECTION
12–40 in / 305–1,016 mm	Open paddle	Replaceable carbide	By tool string
Custom	Layout by soil behavior	Grade by application	Pin / Box confirmed at order

FORMATION RECOMMENDATION GUIDE

✓ RECOMMENDED	ⓘ USE WITH CAUTION	✗ NOT RECOMMENDED
- Silty or muddy clay - Loam and sandy clay - Cohesive soil	- Backfill / variable fill - Reactive clay - Poor returns	- Competent rock - Large cobbles - Uncontrolled impact loading



Operating parameters and pass planning are supplied with the confirmed tool specification.



Review rig, bore geometry, strength, abrasivity, fluid system and cuttings return.

Cangzhou Drillnova Technology Co., Ltd.

Unit 1214, Building 3, Jinggui Center,
Shicheng Avenue, Cangzhou, Hebei, China

T: +86 317 2020557

M: +86 18832751035 (WhatsApp)

E: Info@drillnova.com



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Version 3.0

