GEOMAT

HYDRAULICS & METAL WORKS

PRODUCT SELECTION GUIDE

Engineering Excellence for Every Project

2026 EDITION

GEOMAT

TABLE OF CONTENTS

ABOUT THIS GUIDE

This Product Selection Guide is designed to help engineers, procurement teams, and project managers identify the optimal drilling equipment and hydraulic solutions for their specific requirements. Whether you are planning mineral exploration, geotechnical investigation, or water well drilling, this guide provides structured decision-making frameworks to streamline your equipment selection process.

WHO IS THIS GUIDE FOR?

- Mining & Exploration Engineers
- Geotechnical Project Managers
- Procurement & Supply Chain Teams
- Drilling Contractors & Operators
- Environmental Engineers

HOW TO USE THIS GUIDE

1. Identify your project type and drilling method
2. Review equipment specifications and comparisons
3. Use selection charts to match requirements
4. Consult technical support for custom configurations
5. Request a quotation through our contact channels

KEY FEATURES

- Detailed specification tables for every product category
- Decision trees and flowcharts for quick selection
- Side-by-side equipment comparison charts
- Application-specific recommendations
- Maintenance guidelines and best practices

HOW TO CHOOSE THE RIGHT EQUIPMENT

A structured approach to equipment selection based on project parameters

01
PROJECT TYPE
Define your application: mineral exploration, geotechnical, water well, environmental, or construction drilling.

02
GROUND CONDITIONS
Assess formation hardness, depth requirements, water table, and geological complexity.

03
PERFORMANCE NEEDS
Determine required drilling diameter, depth capacity, production rate, and core recovery.

04
BUDGET & LOGISTICS
Consider total cost of ownership, site accessibility, power supply, and maintenance capability.

SELECTION PROCESS FLOW

Define Project Scope → Assess Ground Conditions → Select Drilling Method → Choose Equipment → Verify Specifications

PRO TIP
Always consider the total cost of ownership rather than initial purchase price alone. Factor in consumable life, maintenance intervals, operator training, and spare parts availability when comparing equipment options. GEOMAT provides comprehensive lifecycle cost analysis for all major equipment categories.

PROJECT TYPE SELECTION

Match your application to the optimal equipment category

MINERAL EXPLORATION

Diamond core drilling, RC drilling, and geochemical sampling for resource identification and delineation.

GEOTECHNICAL

Site investigation, foundation testing, slope stability analysis, and soil/rock characterisation.

WATER WELL

Production wells, monitoring wells, and dewatering systems for groundwater development.

ENVIRONMENTAL

Contamination assessment, remediation wells, landfill monitoring, and soil vapour extraction.

CONSTRUCTION

Piling, anchoring, grouting, and ground improvement for civil infrastructure projects.

SELECTION TIP: If your project spans multiple categories, prioritise the primary drilling objective and consult GEOMAT technical support for hybrid equipment configurations.

DRILLING METHOD COMPARISON

Compare drilling methods to identify the best approach for your project requirements

METHOD	BEST APPLICATION	DEPTH RANGE	CORE RECOVERY
Diamond Core Drilling	Mineral exploration, geotechnical investigation	50m - 3,000m+	95-100%
RC (Reverse Circulation)	Grade control, resource definition	50m - 500m	N/A (chips)
DTH (Down-the-Hole)	Water wells, blast holes, construction	30m - 300m	N/A (cuttings)
Rotary Drilling	Large diameter holes, oil & gas	100m - 5,000m+	Variable
Wireline Coring	Deep exploration, continuous sampling	200m - 3,000m+	97-100%

DRILL RIG SELECTION

Select the optimal drill rig based on terrain, depth requirements, and mobility needs

SURFACE CORE DRILL RIGS

Skid-mounted and truck-mounted rigs for mineral exploration and geotechnical drilling.

Depth: 50m - 2,000m
Hole Size: NQ, HQ, PQ
Power: Diesel / Electric
Mobility: Truck / Skid / Track

UNDERGROUND DRILL RIGS

Compact hydraulic rigs designed for confined underground mining environments.

Depth: 50m - 1,500m
Hole Size: BQ, NQ, HQ
Power: Electric / Hydraulic
Mobility: Rail / Rubber Tyred

MULTIPURPOSE RIGS

Versatile platforms for water well, geotechnical, and environmental applications.

Depth: 30m - 500m
Hole Size: Variable
Power: Diesel
Mobility: Truck / Crawler

SELECTION CRITERIA

Consider: Target depth | Required hole diameter | Terrain accessibility | Power source availability | Production rate requirements | Environmental constraints

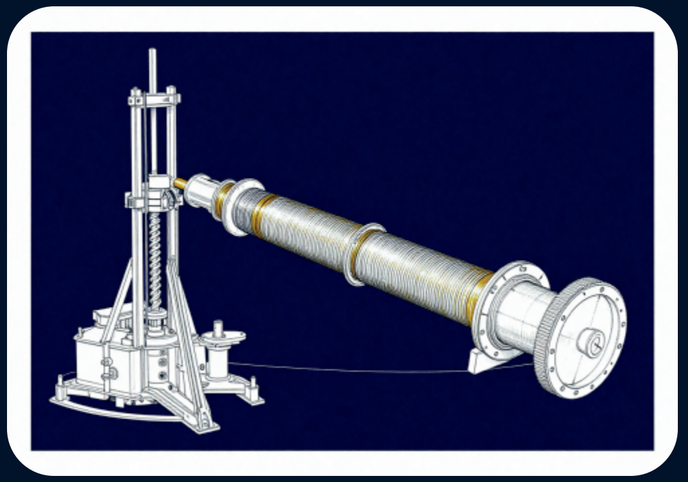
WIRELINE CORE DRILLING SYSTEMS

High-efficiency continuous coring systems for deep exploration programmes

SIZE	HOLE DIA. (mm)	CORE DIA. (mm)	ROD OD (mm)	DEPTH CAPACITY
AQ	48.0	27.0	44.5	Up to 300m
BQ	60.0	36.5	55.6	Up to 600m
NQ	75.7	47.6	69.9	Up to 1,200m
HQ	96.0	63.5	88.9	Up to 2,000m
PQ	122.6	85.0	114.3	Up to 1,500m

KEY ADVANTAGES

- Continuous core retrieval without pulling the drill string
- Reduced trip time increases productivity by up to 40%
- Consistent core quality for accurate geological logging
- Compatible with standard wireline overshot assemblies



CORE BARREL SELECTION

Choose the right core barrel configuration for your ground conditions

STANDARD CORE BARREL

Conventional double-tube design for competent rock formations with minimal fracturing.

APPLICATIONS:

- Stable ground conditions
- Medium to hard rock
- Standard exploration programmes
- Cost-effective solution

TRIPLE TUBE CORE BARREL

Triple-tube system with split inner tube for maximum core protection in fractured zones.

APPLICATIONS:

- Highly fractured rock
- Soft or friable formations
- Core orientation required
- Premium core quality

FACE DISCHARGE BARREL

Specialised barrel with face discharge ports for improved flushing in challenging conditions.

APPLICATIONS:

- Sticky clay formations
- Blocked bit face conditions
- Variable ground types
- Deep hole applications

SELECTION TIP: For projects with variable ground conditions, consider a triple-tube barrel as your primary system with standard barrels for competent zones. This approach maximises core recovery while optimising operational costs.

DRILL ROD SELECTION

Select the correct rod grade and size for your drilling programme depth and conditions

ROD SIZE	OUTER DIA.	INNER DIA.	THREAD	GRADE	MAX DEPTH
AW	44.5 mm	38.1 mm	API Regular	Standard	300m
BW	54.0 mm	48.0 mm	API Regular	Standard/Premium	600m
NW	66.7 mm	60.3 mm	API IF	Premium	1,200m
HW	88.9 mm	77.8 mm	API IF	Premium/Ultra	2,000m
PW	114.3 mm	101.6 mm	API IF	Ultra	1,500m

ROD GRADES

Standard: General exploration to moderate depths. Suitable for straight holes in stable ground.

Premium: Deep holes and directional drilling. Higher tensile strength and fatigue resistance.

Ultra: Maximum depth applications. Superior metallurgy for extreme conditions and extended service life.

SELECTION TIP: Always select rod grade based on maximum anticipated depth plus a 20% safety margin. For deviated holes, upgrade one grade level to account for increased bending stress.

DIAMOND DRILL BIT SELECTION

Match bit type and matrix hardness to your formation for optimal penetration and life

IMPREGNATED BITS

Hard, abrasive formations

- Granite, quartzite, basalt
- Self-sharpening diamond exposure
- Long life in uniform ground
- Matrix hardness: Series 4-10

SURFACE SET BITS

Soft to medium formations

- Limestone, sandstone, shale
- Large exposed diamonds
- High penetration rate
- Matrix hardness: Series 1-4

ELECTROPLATED BITS

Soft, non-abrasive formations

- Clay, coal, soft sediments
- Single layer diamond coating
- Maximum penetration speed
- Cost-effective for short runs

PDC BITS

Medium formations, large diameter

- Dolerite, medium sandstone
- Polycrystalline diamond cutters
- High ROP in suitable ground
- Ideal for production drilling

MATRIX HARDNESS SCALE

SOFT (Series 1-2) MEDIUM (Series 3-5) HARD (Series 6-8) VERY HARD (Series 9-10)

SELECTION TIP: When formation hardness is unknown, start with a medium-matrix impregnated bit (Series 6). Monitor penetration rate and adjust matrix hardness accordingly. Softer matrix for harder rock, harder matrix for softer rock.

DTH HAMMER & BIT SELECTION

Select the correct hammer and bit combination for your hole diameter and ground conditions

DTH HAMMERS

3" - 4" HAMMERS
89-115mm hole range

5" - 6" HAMMERS
127-171mm hole range

8" - 12" HAMMERS
203-311mm hole range

DTH BIT TYPES

FLAT FACE
General purpose drilling in medium formations

CONCAVE
Hard rock with good flushing requirements

CONVEX
Soft to medium overburden drilling

DROP CENTRE
Fractured ground, directional stability

SELECTION TIP: Match hammer size to your compressor capacity. Operating a hammer below minimum air volume causes overheating and premature failure. Always verify air consumption requirements against available compressor output at altitude.

RC DRILLING TOOL SELECTION

Reverse circulation tools for efficient grade control and resource definition drilling

RC HAMMERS

High-performance percussion hammers for reverse circulation drilling in hard rock.

- 4" to 5.5" hammer sizes
- Operating pressure: 24-35 bar
- Air volume: 15-30 m3/min
- Impact energy: 200-450 joules
- Designed for 100,000+ impacts

RC DRILL BITS

Tungsten carbide button bits engineered for maximum penetration and sample quality.

- Flat face for general purpose
- Concave for hard formations
- Reaming bits for oversize holes
- Button configurations: 8-20mm
- Gauge protection inserts

RC DRILL RODS & SUBS

Heavy-duty dual-wall pipe systems for uncontaminated sample recovery.

- 4.5" OD x 3" ID standard
- Thread: API 3.5" IF
- Wall thickness: 9.5mm
- Lengths: 1.5m, 3m, 6m
- Crossover subs available

SELECTION TIP: For RC drilling, ensure your compressor delivers at least 25% more air volume than the hammer's minimum requirement. This accounts for pressure losses in the drill string and maintains optimal bit face velocity for clean sample recovery.

ROTARY DRILLING TOOL SELECTION

Rotary tools for large-diameter production and construction drilling applications

TRICONE BITS

Three-cone roller bits for large diameter holes in varied formations.

- Sizes: 6" to 17.5"
- IADC codes: 1-1-1 to 8-4-7
- Sealed bearing & open bearing
- Steel tooth & tungsten carbide insert
- Ideal for soft to hard formations

DRAG BITS & BLADES

Fixed cutter bits for soft formation drilling with high penetration rates.

- Chevron & step-type designs
- Sizes: 6" to 26"
- Replaceable blade systems
- High ROP in clay & shale
- Low cost per metre in soft ground

STABILISERS & REAMERS

Hole opening and stabilisation tools for maintaining hole quality.

- Near-bit & string stabilisers
- Integral blade & replaceable sleeve
- Hole openers: 8" to 36"
- Roller reamers for hard rock
- Maintains hole gauge & direction

SELECTION TIP: For rotary drilling, match bit type to formation hardness. Tricone bits offer versatility across formations while drag bits deliver superior ROP in soft ground. Always consider hole diameter requirements and available rig torque capacity.

HYDRAULIC SYSTEM SELECTION

Power packs, cylinders, and control systems for drilling and industrial applications

SYSTEM	FLOW RATE	PRESSURE	POWER	APPLICATION
HPU-30	30 L/min	210 bar	11 kW	Light drill rigs, grouting
HPU-60	60 L/min	280 bar	22 kW	Medium drill rigs, anchoring
HPU-120	120 L/min	350 bar	45 kW	Heavy drill rigs, piling
HPU-200	200 L/min	350 bar	75 kW	Large rigs, TBM support
CUSTOM	To spec	Up to 450 bar	To spec	Bespoke engineered systems

SELECTION TIP: Size your hydraulic power unit based on the simultaneous demand of all circuits. Add 15% capacity margin for system losses and future expansion. GEOMAT engineers custom HPUs to exact project specifications.

ENVIRONMENTAL ENGINEERING SOLUTIONS

Sustainable drilling solutions for environmental remediation, monitoring, and compliance

GROUNDWATER MONITORING

Well screens, casings, and completion tools for environmental monitoring programmes.

SOIL & VAPOUR SAMPLING

Precision sampling tools for contaminated land assessment and remediation verification.

REMEDIATION SYSTEMS

Injection and extraction tools for in-situ treatment of contaminated groundwater.

LANDFILL & GEOTECHNICAL

Specialised tools for landfill gas extraction, leachate management, and ground investigation.

SELECTION TIP: Environmental projects require materials compatible with the contaminants being monitored. Always specify inert materials (stainless steel or HDPE) to prevent sample cross-contamination and ensure regulatory compliance.

SPARE PARTS & ACCESSORIES

Genuine replacement parts and accessories to maintain peak equipment performance

CONSUMABLES

- Diamond bits & reaming shells
- Core lifters & springs
- O-rings & seal kits
- Drilling fluids & additives
- Carbide inserts & buttons

WEAR PARTS

- Chuck jaws & bushings
- Spindle bearings
- Hydraulic hoses & fittings
- Pump liners & pistons
- Brake pads & clutch plates

ACCESSORIES

- Rod handling tools
- Core trays & boxes
- Hoisting equipment
- Pressure gauges & meters
- Safety equipment & PPE

ORDER NOTE: All GEOMAT spare parts are manufactured to OEM specifications. Contact our parts department with your equipment serial number for guaranteed compatibility. Express shipping available for urgent requirements.

Side-by-side performance comparison to support your procurement decisions

PARAMETER	CORE DRILLING	RC DRILLING	DTH DRILLING	ROTARY
Hole Diameter	27-150mm	89-171mm	89-311mm	152-914mm
Max Depth	2,000m+	500m	300m	1,000m+
Sample Type	Intact core	Chips (1-3kg)	Chips	Cuttings
Best For	Exploration	Grade control	Water wells	Production
ROP (m/hr)	1-5	15-40	10-30	5-20
Cost/Metre	High	Medium	Low-Medium	Medium-High
Formation	All types	Hard rock	Hard rock	Soft-Medium
Air Required	No	Yes (high)	Yes	Optional

MAINTENANCE & BEST PRACTICES

Maximise equipment life and performance with GEOMAT-recommended maintenance protocols

DAILY CHECKS

- Inspect drill string connections
- Check hydraulic fluid levels
- Verify air pressure settings
- Inspect bit condition & wear
- Grease all pivot points
- Check safety guards & stops

WEEKLY SERVICE

- Replace hydraulic filters
- Inspect hoses for wear/damage
- Check rod thread condition
- Calibrate pressure gauges
- Inspect wireline cable
- Clean cooling systems

MONTHLY OVERHAUL

- Full hydraulic system flush
- Bearing inspection & repack
- Non-destructive testing (NDT)
- Torque all critical fasteners
- Update maintenance log
- Order replacement consumables

BEST PRACTICE: Maintain a detailed drilling log for every shift. Record bit life, penetration rates, fluid consumption, and any anomalies. This data enables predictive maintenance scheduling and reduces unplanned downtime by up to 40%.

FREQUENTLY ASKED QUESTIONS

Answers to common technical and procurement questions from our engineering team

How do I select the correct drill bit for my formation?

Match bit type to rock hardness: impregnated bits for extremely hard rock (>250 MPa), surface-set for hard abrasive formations, and electroplated for soft ground. Contact GEOMAT engineers for formation-specific recommendations.

What is the recommended drill rod replacement interval?

Replace rods when wall thickness reduces by 20% or thread wear exceeds 1.5mm. Conduct regular NDT inspections every 500 operating hours. GEOMAT offers rod inspection services on-site.

Can GEOMAT supply custom-engineered hydraulic systems?

Yes. Our engineering team designs bespoke HPUs, manifolds, and control systems to exact project specifications. Lead time is typically 6-8 weeks from design approval.

What warranty coverage do GEOMAT products carry?

All GEOMAT manufactured products carry a 12-month warranty against defects in materials and workmanship. Extended warranty programmes are available for fleet customers.

Do you offer technical support for remote project sites?

Yes. GEOMAT provides 24/7 remote technical support via phone and video. For critical situations, our field engineers can mobilise within 48 hours to most global locations.

TECHNICAL SUPPORT

Expert engineering assistance available globally, around the clock

24/7 REMOTE SUPPORT

Phone, email, and video support from our engineering team. Real-time troubleshooting for drilling operations worldwide.

FIELD ENGINEERING

On-site technical support with mobilisation within 48 hours. Equipment commissioning, training, and optimisation services.

TRAINING & CERTIFICATION

Comprehensive operator training programmes for all GEOMAT equipment. Certified courses for drilling crews and maintenance teams.

SUPPORT PROCESS: Contact our team with your equipment model and serial number. Our engineers will diagnose the issue remotely and recommend the fastest resolution path - whether remote guidance, parts dispatch, or field engineer deployment.

CONTACT GEOMAT

Partner with us for your next drilling project

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