

Foothills Resource Services

..... Core Head Catalog



FOOTHILLS
RESOURCE SERVICES



PDC Core Heads 2019

About

Core head design and manufacture represents centuries of combined experience from providing high quality core samples throughout the world in many different applications.

All core heads are designed by Foothills Resource Services using the latest in CAD and bit performance technologies. Manufacturing is carried out to extremely high tolerances under an QA/QC program that is unmatched in North America

No matter the objective of the coring program, Foothills Resources Services can provide a best for scenario core head that has been proven time and time again around the globe

Company Profile

Foothills Resource Services Inc. (FRS) began providing coring services in 1960. Since that time, the company has grown to become a world leader in providing conventional, wireline, long barrel coring and providing core-related site services within the oil and gas industry. The company has a large number of global clients which use Foothills for coring services, both onshore and offshore.

Over the near six decades of operations, Foothills has amassed an unprecedented understanding and knowledge of what it takes to get the job done right the first time. Equipment designs are modeled from real world feedback, the combined centuries of experience from our coring engineers and combined with the latest technologies and stringent quality assurance programs to deliver the best equipment and service around the world.

Foothills' focus is on providing the highest quality core samples possible which comes firstly from the design and proper selection of the core head.

Together all of the product innovations, service offerings and well trained and professional staff have made FRS one of the leading coring service providers in the world today. As the company continues to expand, the dedication to excellence will continue and Foothills will continue to be the preferred company when any and all types of coring services are required

Design & Manufacture

Foothills Resource Services stands for quality products Made in Canada. A superior quality standard is an uncompromisable focus of the company and the basis of our high success rates.

In order to meet our stringent quality assurance goals, Foothills' core heads are manufactured in accordance to latest QA/QC standards. The facility is equipped with audited and calibrated measuring equipment capable of 0.0000001" accuracy.

Most important are the certifications held for ISO 9001, API-7F and QMF-27



Quality Assurance



PDC Cylinders

Foothills PDC cutters are sourced from start to finish under the same roof and undergo a rigorous, but noninvasive inspection process, all in compliance with ISO 9001:2008 quality standards. In the field, they have been proven in a variety of drilling conditions on every continent on the planet.



OD Gauge Protection

Western sourced and manufactured press in carbide buttons are used in the wear pads to provide maximum bit life in the harshest of conditions. Various sizes and geometries are carefully selected to guarantee performance.



Impregnated Diamond Inserts

Diamond-impregnated inserts are composed of a tough, wear-resistant, tungsten carbide capsule infused with ultra-hard synthetic or natural diamond mesh or TSP.



TSP

Extensive research in house research has been conducted on the various TSP materials on the market in order to ensure that we only supply TSP with the highest performance and the greatest value. Proprietary slurry abrasion test evaluates the abrasive wear properties and toughness of the materials to determine which grades will provide you with the best overall performance. .

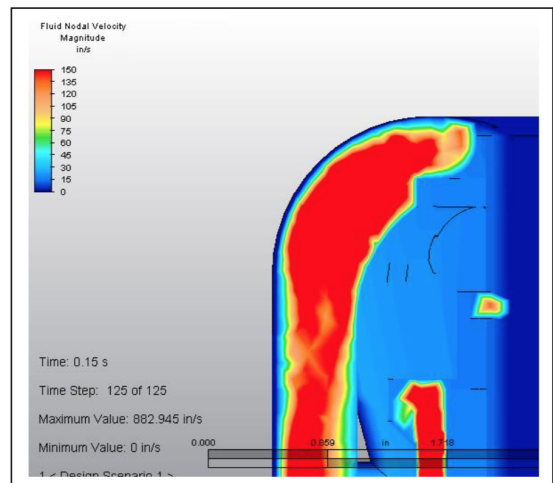


Natural Diamond

Typically used in surface set bits, our natural diamond stones are closely inspected for accurate sizing and classification so you can be sure you'll get the size and quality of stone that you need.

Natural diamond stones are classified by shape and diamond structure. Some have been thermally, mechanically, or chemically conditioned to give them a more uniform shape and the toughness required by demanding drilling conditions.

Cross Section, in front of a Blade



CFD

Each core head design is vigorously tested in our CFD software to simulate real world performance. Tests are conducted for a minimum 24 hours to ensure optimal ROP, cooling and bit life

PDC Core Heads



PDC core heads are the undisputed work horse of the modern drilling industry. With our versatility and many design options Foothills can provide a core head specific to application in order to optimize core quality, recovery and extremely low filtrate invasion all while achieving record ROP in many cases.

Standard Features

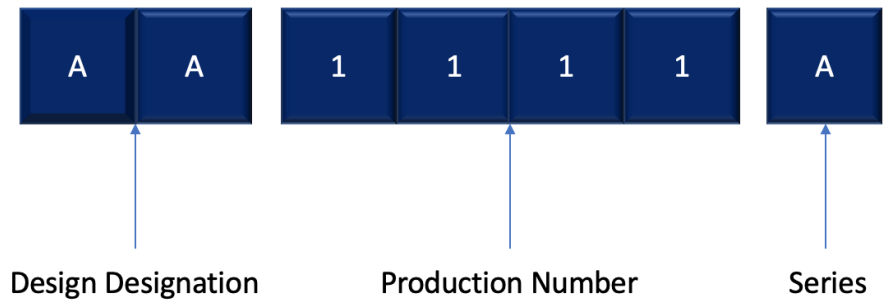
- Low Invasion design
- Face Discharge with sleeved ports
- Tungsten button gauge protection
- Diamond-less throat for true Low Invasion Coring
- Anti-Whirl and Balancing
- Cutter placement calculated for load distribution
- High Quality components
- UT inspected steel material

Customization

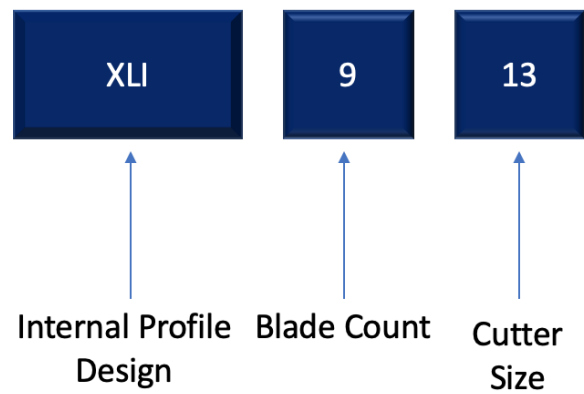
- Port Size
- Cutter Size and Density
- OD (true gauge or undergauge)
- PDC Type
- Thread Profile

Core Head Designations

Serial Number



Model Number

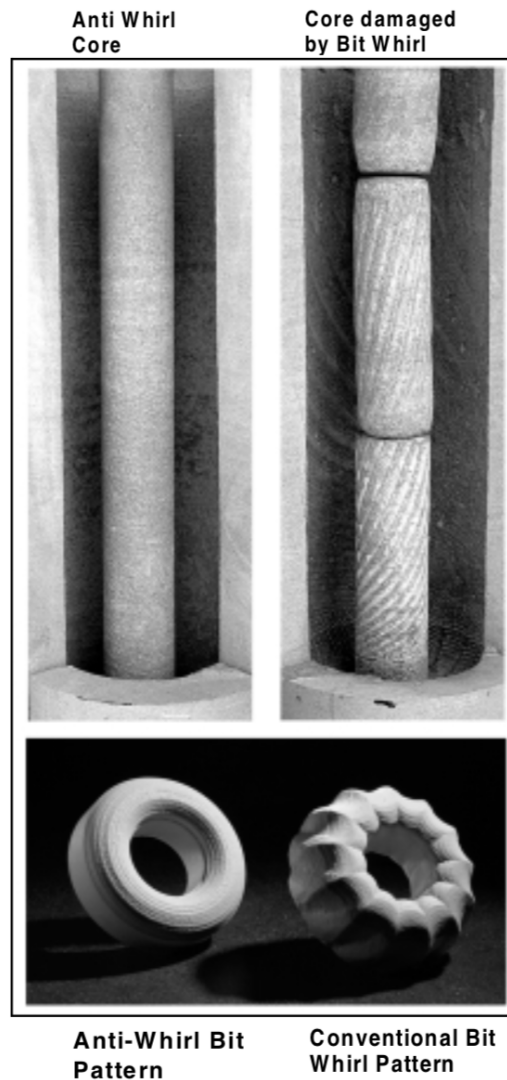
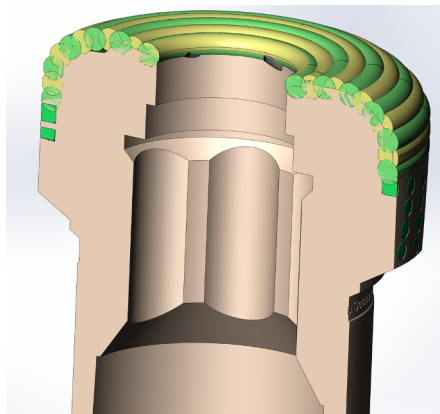
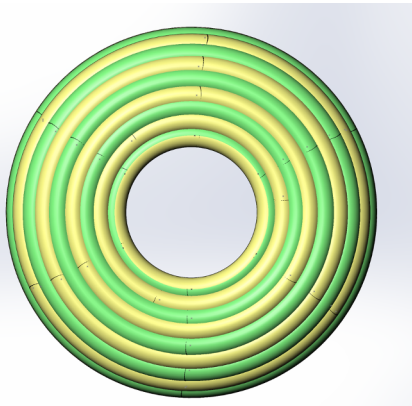


Technology

Anti Whirling Technology

Bit whirling and improper balance can be incredibly disastrous to a core sample.

During the design phase each pattern is aggressively tested and simulated to ensure that every core head produced will not create core whirling when run properly.



Low Invasion Technology

Low invasion coring systems have become the global standard for Foothills. Above client requests the Foothills low invasion systems have proven to provide the best combination of recovery, ROP and core quality and as such is the normally recommended system for all but the most extreme coring programs.

LI (Low Invasion) Series

The LI designation on the core head is representative of Foothills first generation of low invasion technology. Developed with a large multi-national operator company with the challenge of providing better quality and more usable core samples, the technology has been in use since the early 1990's and continues to be sold to equipment clients today. The design has been proven to deliver very fast ROP and up to 95% fluid deflection

XLI (Extreme Low Invasion)

An update and proprietary low invasion technology achieving up to 40% faster ROP over the LI series and capable of up to 99% fluid deflection the XLI series is standard offering when Foothills is providing the coring service.

By no longer requiring an extended pilot shoe, the XLI system can be run in more extreme conditions as it protects the core from impact damage. The XLI system continues to deliver the best quality core sample and consistently high recovery on every continent.

IADC Classifications

IADC CLASSIFICATION FOR PDC AND DIAMOND BITS

IADC code consists of four characters, indicating bit body, formation type, cutting structure and bit profile. First character is literal, others – numerical.

First literal code character designates the bit body material (**S**teel, **M**atrix or **D**iamond).

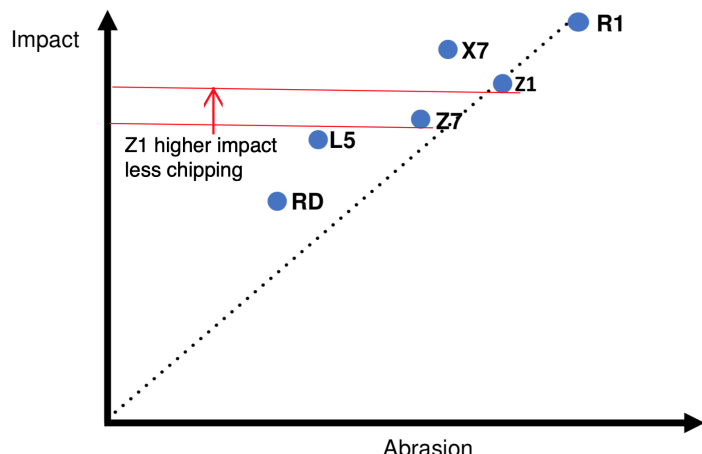
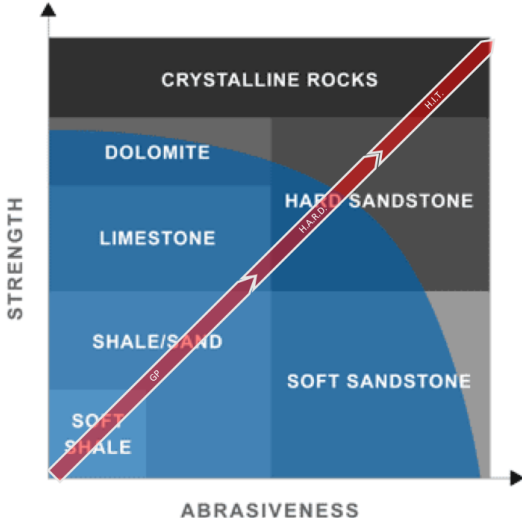
Second numerical code character (1-8) designates the formation type being drilled. Category 5 has no code.

Third numerical code character designates drill bit cutting structure (PDC cutter size, diamond cutter type). Drill bits are equipped with 8-19 mm PDC cutters for 1-4 formation type categories and with natural diamonds, thermally stable polycrystalline diamonds (TPS), their combination or impregnated diamonds for 6-8 formation type categories.

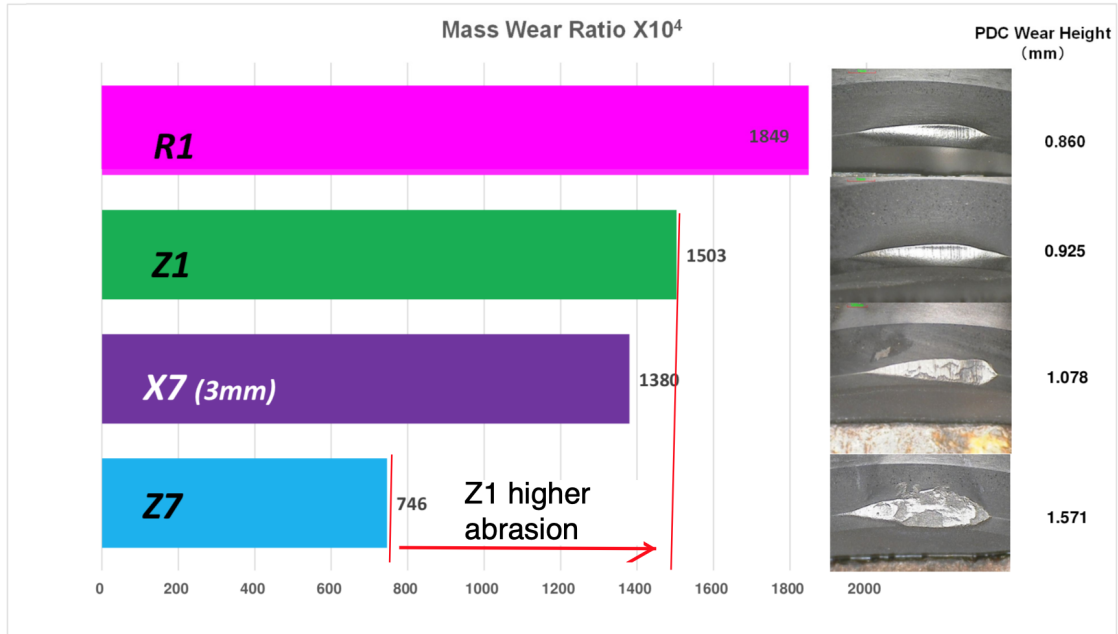
Fourth numerical code character – bit profile.

1	2		3				4			
Bit body	Formation type		Size of PDC cutters				Bit profile			
			1	2	3	4	1	2	3	4
S – steel M – matrix D – diamond	Very soft	1	.	19	13	8	Short fishtail	Short profile	Medium profile	Long profile
	Soft	2								
	Soft to medium	3								
	Medium	4								
	no code	5	Diamond cutters type							
	Medium hard	6	Natural diamond	Thermally stable (TSP)	Combination	.				
	Hard	7								
	Extremely hard	8	.	.	Impregnated diamond	.				

PDC Cutter Selection



VTL Testing un-leached



Core Head Selection Guide

IADC Class	Formation Description	Rock Type	Recommended Core Head Characteristics
1	Soft formation with sticky layers and low compressive strength	Gumbo, Clay, Marl	5 to 6 blade, light set, large PDC, (RD,L5), flat profile
2	Soft Formation with low compressive strength and high drillability	Marl, Salt, Anhydrite Shale	5 to 6 blade, light to medium set, large to medium PDC, (RD, L5), flat profile
3	Soft to Medium Formation with low compressive strength interbedded with hard layers	Sand, Shale, Chalk	5 to 6 Blade, Medium Set, Medium PDC (RD,L5), flat profile
4	Medium to hard formation with high compressive strength and small abrasive layers	Shale, Mudstone, Limestone	6 to 8 Blade, medium to heavy set, small to medium PDC (L5,Z7) flat to small parabolic profile
6	Hard and dense formation with very high compressive strength but non abrasive	Limestone, Sandstone	6 to 8 Blade, Medium to Heavy Set, small to medium PDC (Z7,Z1,R1) small parabolic profile
7	Hard and dense formation with very high compressive strength and some abrasive formation layers	Siltstone, Sandstone	7 to 9 blade, heavy set, small PDC (Z1,R1) small parabolic profile
8	Extremely Hard and Abrasive Formation	Quartzite, Volcanic	8 to 9 Blade, Heavy Set, PDC (R1) , medium to large parabolic profile or Impregnated Diamond

Core Head Availability

Core Barrel Size	Configuration	OD Sizes	DTS Core Sie	TTS Core Size
5 Inch	508	5 ⁷ / ₈ to 6 ³ / ₄	3.00	2.75
	511			
	611			
	613			
	709			
	808			
	908			
6 ³ / ₄ Inch	511	7 ⁷ / ₈ to 9	4.00	3.5
	513			
	613			
	616			
	619			
	713			
	716			
	719			
	811			
	813			
	816			
8 Inch	6 13	12 to 13 ¹ / ₂	5.25	4.75
	616			
	6 19			
	621			
	713			
	716			
	719			
	813			
	816			
	819			
	913			
	916			

- Custom Sizes and Configurations Are Available On Request

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