

BITS



PPGL can supply two large series products of roller bits and diamond bits, both of them are processed by reputation manufacturers in China.

ROLLER CONE BITS

- Roller Cone Bit Type
- SV Series Six-point Position-stabilized Motor Tri-cone Bit
- SJ Series Metal Sealed Bearing Tri-cone Bit
- S Series Elastomer Sealed Journal Bearing Tri-cone Bit
- S Series Elastomer Sealed Roller Bearing Tri-cone Bit
- S Series Non-sealed Roller Bearing Tri-cone Bit
- SG Series Improved Sealed Roller Bearing Tri-cone Bit
- SK Series Air-cooling Roller Bearing Tri-cone Bit
- SD Series Single Cone Bit
- SL Series Pilot Reamer
- Optional Feature

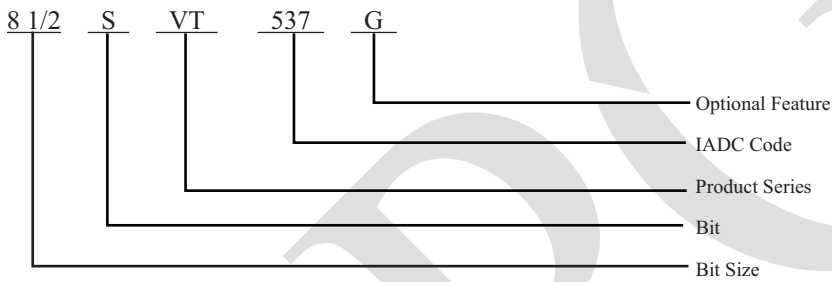
DIAMOND BITS

- PDC Bit Type
- Core Bit Type
- PDC Bit Series
- Core Bit Series
- Optional Feature

ROLLER CONE BITS



ROLLER CONE BIT TYPE



Production Series	specification
S	Elastomer sealed journal bearing tri-cone bit
	Elastomer sealed roller bearing tri-cone bit
	Non-sealed roller bearing tri-cone bit
SJ	Metal sealed bearing tri-cone bit
SV	Six-point position-stabilized motor tri-cone bit
SG	Improved sealed roller bearing tri-cone bit
SK	Air-cooling roller bearing tri-cone bit
SL	Pilot reamer
SD	Single cone bit

Optional Feature	Specification
C	Central nozzle
E	Extended nozzle
G(1 st)	Gauge/body protection
G(2 nd)	Diamond gauge protection
K	Widened crest insert
L	Lug pad
W	Strengthened cutting structure
X	Chisel insert
Y	Conical insert

FOR EXAMPLE:

8 1/2: Bit diameter is 8 1/2 inches(215.9mm)

S: Bit

V: Six-point position stabilization

T: Gauge trimmer

537: Insert bit for drilling in soft to medium formation

With low compressive strength

G: Gauge/body protection



Bit Bearing and Character

Bit Series	SV	SJ	S	SG	SK	SD	SL
Journal bearing	•	•	•			•	•
Roller bearing			•				
Improved roller bearing				•			
Air-cooling roller bearing					•		
Metal seal	•	•					
Elastomer seal			•	•		•	•
Non-seal			•		•		
Gauge trimmer	•	•	•	•			•

SV SERIES SIX-POINT POSITION-STABILIZED MOTOR TRI-CONE BIT CURRENT AVAILABILITY

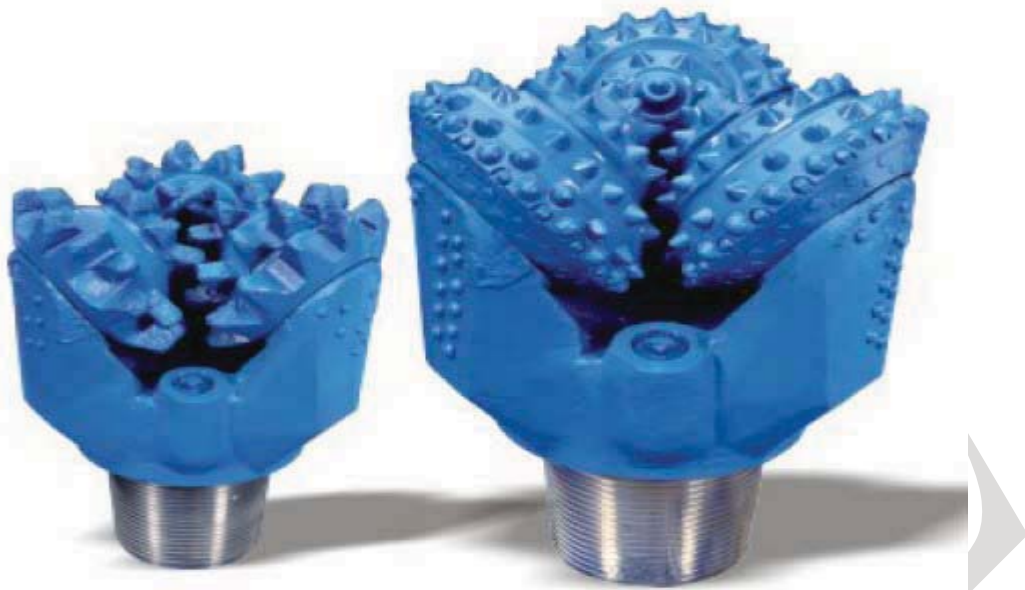
Bit size		Bit Type
in	mm	
8 1/2	215.9	SVT437G SVT447G SVT517G SVT527G SVT537G SVT547G SVT617G
9 1/2	241.3	SVT437G SVT447G SVT517G SVT527G SVT537G SVT547G SVT617G
12 1/4	311.1	SVT437G SVT447G SVT517G SVT527G SVT537G SVT547G SVT617G



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
437 447	0.35~0.9	240~70	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, gypsum, salinastone, soft shale, soft limestone, etc.
517 527	0.35~1.0	220~60	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
537 547	0.45~1.0	220~50	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with harder and abrasive interbeds, etc.
617	0.45~1.1	220~50	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

SJ SERIES METAL SEALED BEARING TRI-CONE BIT



CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
7 7/8	200.0	SJ517G SJ527G SJ547GY SJ617GY SJ627G SJ637GY
8 1/2	215.9	SJT117GW SJT127GW SJT437GK SJT447GK SJT517G SJT537G SJT617GY SJT627G SJT637GY
9 1/2	241.3	SJT117GW SJT127GW SJT437G SJT517G SJT537G SJT547G SJT617GY
12 1/4	311.1	SJT117GW SJT127GW SJT437G SJT517G SJT537G SJT617GY SJT627G SJT637GY
17 1/2	444.5	SJT117GW SJT127GW SJT517G SJT537G SJT617GY SJT627G SJT637GY

IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
117	0.35~0.8	240~80	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, etc.
127	0.35~0.9	240~70	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
437 447	0.35~0.9	240~70	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, gypsum, salinastone, soft shale, soft limestone, etc.
517 527	0.35~1.0	220~60	Soft formations with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
537 547	0.45~1.0	220~50	Soft medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with harder and abrasive interbeds, etc.
617 627	0.45~1.1	200~50	Medium hard formations with high compressive strength, such as: hard shale, limestone, sandstone, dolomite, etc.
637	0.5~1.1	180~40	Hard formations with high compressive strength, such as: sandstone, limestone, dolomite, hard gypsum, marble, etc

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

S SERIES ELASTOMER SEALED JOURNAL BEARING TRI-CONE BIT



CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
3 1/2	88.9	S527C
4 5/8	117.5	S126 S517
4 3/4	120.7	S116C
5 7/8	149.2	S216 S537 S547 S637
6	152.4	S117W S216 S246 S517 S547
6 1/4	158.8	S127W S247 S517 S527 S547 S637
6 1/2	165.1	S127W S217 S517 S537
6 3/4	171.5	S116GW S447 S537
7 1/2	190.5	S127W S217 S517 ST517 S527 ST527 S617
7 7/8	200.0	S117GW S437G S517G S527G S537G S547G S547GY S617GY S627G S637GY
8 3/8	212.7	S217 S527 S547
8 1/2	215.9	ST117W ST127W S137W S217 S247 ST437GK ST447GK ST517GK ST527GK ST537G ST547G S617G S627G S637G
8 3/4	222.3	S116GW S437GK ST517G S537G S627G
9 1/2	241.3	ST117CW ST127GW ST417G ST437G ST527G ST537G ST547G ST617G
9 5/8	244.5	ST437G ST517G S527G
9 7/8	250.8	S117GW ST417GK ST437G ST517G S527G
10	254.0	S126W
10 5/8	269.9	ST127GW S217G ST437G ST517G ST547G
11	279.4	S117GW S517G S537G
11 5/8	295.3	S117GW S127GW S137GW S217G ST417G ST517G ST537G ST547G
12	304.8	S126W S216 ST517 ST537 ST547 S617
12 1/4	311.2	ST117W S127W S137 ST417GK ST437G ST517G ST527G ST537G ST547G ST617GY S627G S637G
12 3/8	314.0	ST437G ST517G ST527G ST537G ST547G ST617GY
12 15/32	316.5	ST437G ST517G ST527G ST537G ST547G ST617GY S627G S637G

13 1/8	333.4	ST437G ST517G ST527G ST537G ST547G
13 5/8	346.1	S437G S517G S537G
13 3/4	349.3	S437G S517G S537G
14 3/4	374.7	S117GW S127GW S137G S517G S527G
15 1/2	393.7	S127GW S217G S517G S527G S537G S547G
16	406.4	ST117GW ST127GW S127G ST517G ST527G S535 ST537G ST547G S545
17 1/2	444.5	ST117GW S127W S137 ST437G ST517G ST527G ST537G ST547G
18	457.2	ST547G
18 1/2	469.9	S547G

IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
116 117	0.35~0.8	150~80	Extremely soft formations with low compressive strength and drillability, such as: clay, mudstone, chalk, etc.
126 127	0.35~0.9	150~70	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
136 137	0.35~1.0	120~60	Soft to medium formations with low compressive strength, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with harder interbeds, etc.
216 217	0.4~1.0	100~60	Medium hard formations with high compressive strength, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with interbeds, etc.
246 247	0.4~1.0	80~50	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.
417 437 447	0.35~0.9	150~70	Extremely soft formations with low compressive strength, such as: clay, mudstone, chalk, gypsum, salinastone, soft shale, soft limestone, etc.
517 527	0.35~1.0	140~60	Soft formations with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
537 547	0.45~1.0	120~50	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium formation with had and interbeds, etc.
617 627	0.45~1.1	90~50	Medium hard formations with hard compressive strength, such as: hard shale, limestone, sandstone, dolomite, etc.
637	0.5~1.2	80~40	Hard formations with high compressive strength, such as: sandstone, limestone, dolomite, hard gypsum, marble, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

S SERIES ELASTOMER SEALED ROLLER BEARING TRI-CONE BIT

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
5 7/8	149.2	S214
7 1/2	190.5	S124C S134C S244C
7 7/8	200.0	S124 S134
8 3/8	212.7	S215
8 1/2	215.9	S124W S134
9 1/2	241.3	S124G
9 5/8	244.5	S114G S124G S134G
9 7/8	250.8	S115GW
10 5/8	269.9	S115GW S125GW S215G
11	279.4	S115GW
11 5/8	295.3	S115GW S125GW S215G
12	304.8	S124W
12 1/4	311.2	ST115GW ST125GW S135 S214 S244 S324
13 5/6	346.1	ST115GW S124W
13 3/4	349.3	ST115W ST125W ST135W
14 3/4	374.6	S115GW S125GW S135GW
15	381.0	S124G S244G
15 1/2	393.7	S115GW S125GW S135GW S215G
17 1/2	444.5	S115GW S125GW S135G S215G
19 1/4	489.0	S115CGW S225CG
20	508.0	S125CGW S215CGW S515CG ST515CG S525CG ST525CG ST545CG
22	558.8	S125C
24	609.0	S125C
26	660.4	S124C S134C S525CG
36	914.4	S124CW



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
114 115	0.3~0.75	180~60	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, etc.
124 125	0.3~0.85	180~60	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
134 135	0.3~0.95	150~60	Soft to medium soft formations with low compressive strength and high drillability, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.
214 215	0.35~0.95	150~60	Medium formations with high compressive strength, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.

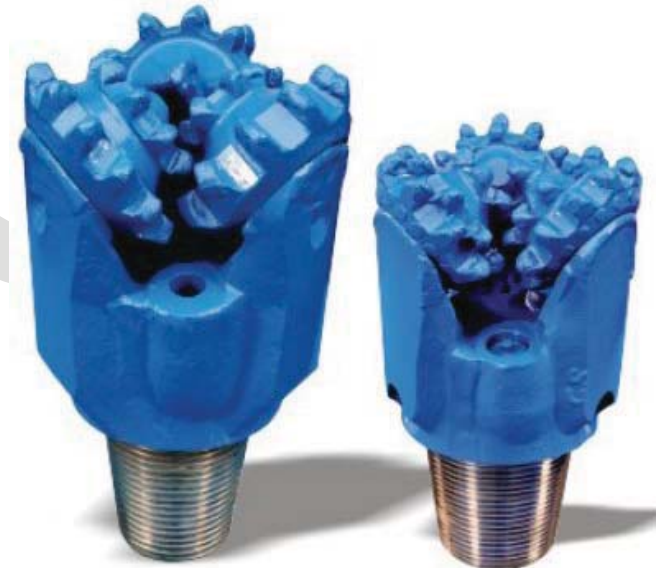
244	0.35~0.95	150~50	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.
324	0.4~1.0	120~50	Medium abrasive formations, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.
515 525	0.35~0.9	180~60	Soft formations with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
535 545	0.35~1.0	150~60	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with harder and abrasive interbeds, etc
615 625	0.45~1.1	120~50	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, etc.
635	0.5~1.2	100~40	Hard formations with high compressive strength, such as: sandstone, limestone, dolomite, hard gypsum, marble, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

S SERIES NON-SEALED ROLLER BEARING TRI-CONE BIT

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
4 1/4	107.9	S131C S321C
4 5/8	117.5	S241C
4 3/4	120.6	S241C
5 5/8	142.9	S121 S241 S321
6	152.4	S211
6 1/4	158.7	S121 S241 S321
6 3/4	171.4	S121 S241 S321
7 1/2	190.5	S121
7 7/8	200.0	S121 S131 S241 S321
9 7/8	250.8	S121 S211 S241 S321
12 1/4	311.1	S211



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
111	0.3~0.75	200~80	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, etc.
121	0.3~0.85	200~80	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, shale, soft limestone, etc.
131	0.3~0.95	180~80	Soft to medium soft formations with low compressive strength and high drillability, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.
211	0.35~0.95	180~80	Medium formations with high compressive strength, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.
241	0.35~0.95	180~70	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.
321	0.4~1.0	150~70	Medium abrasive formations, such as: abrasive shale, limestone, sandstone, dolomite, hard gypsum, marble, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

SG SERIES IMPROVED SEALED ROLLER BEARING TRI-CONE BIT

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
16	406.4	SGT115GW
17 1/2	444.5	SGT115GW SG125G SG135G SGT435G SGT515G SGT525G SGT535G SGT545G SGT615G SGT625G SGT635G
20	508.0	SG125CGW SG215CGW



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
115	0.3~0.75	200~80	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, etc.
125	0.3~0.85	200~80	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
135	0.3~0.95	180~80	Soft to medium soft formations with low compressive strength and high drillability, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.
215	0.35~0.95	180~80	Medium formations with high compressive strength, such as: medium soft hard gypsum, medium soft limestone, medium soft sandstone, soft formation with hard interbeds, etc.
435 445	0.35~0.95	150~60	Extremely soft formations with low compressive strength and high drillability, such as: clay, mudstone, chalk, gypsum, salinastone, soft shale, soft limestone, etc.
515	0.3~0.8	200~80	Soft formations with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
535 545	0.35~0.9	180~80	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with hard and abrasive interbeds, etc.
615 625	0.35~1.0	180~80	Medium hard formations with high compressive strength, such as: abrasive shale, limestone, sandstone, dolomite, etc.
635	0.4~1.1	150~60	Hard formations with high compressive strength, such as: sandstone, limestone, dolomite, hard gypsum, marble, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

SK SERIES AIR-COOLING ROLLER BEARING TRI-CONE BIT

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
9 7/8	250.8	SK512G SK542G SK612G SK732G



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
512	0.35~0.7	120~60	Soft formations with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
542	0.4~0.8	100~60	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with harder and abrasive interbeds, etc.
612	0.5~0.9	100~60	Medium hard formations with high compressive strength, such as: hard shale, limestone, sandstone, dolomite, etc.
732	0.6~1.1	90~50	Medium to high abrasive hard formations, such as: hard shale, hard limestone sandstone, whinstone, flintstone, granite, quarts sandstone, hard dolomite, pyrite, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

SD SERIES SINGLE CONE BIT

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
4 1/8	104.8	SD527 SD547 SD617
4 1/2	114.3	SD527 SD547 SD617
4 5/8	117.5	SD527 SD547 SD617
4 7/8	123.8	SD527 SD547 SD617
5 1/2	139.7	SD527 SD547 SD617
6	152.4	SD527 SD547 SD617
6 1/2	165.1	SD527 SD547 SD617
7 1/2	190.5	SD527 SD547 SD617
7 7/8	200.0	SD527 SD547 SD617
8 1/2	215.9	SD527 SD547 SD617



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
527	0.3~0.7	120~50	Soft formation with low compressive strength, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
547	0.3~0.7	100~50	Soft to medium formations with low compressive strength, such as: medium soft shale, medium soft limestone, medium soft sandstone, medium formation with harder and abrasive interbeds, etc.
617	0.4~0.8	90~50	Medium hard formations with high compressive strength, such as: hard shale, limestone, sandstone, dolomite, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

SL SERIES PILOT REAMER

CURRENT AVAILABILITY

Bit Size		Bit Type
in	mm	
28	711.2	SL117GW SL127GW SL517G SL537G
30	762.0	SL117GW SL127GW SL517G SL537G
32	812.8	SL117GW SL127GW SL517G SL537G
36	914.4	SL117GW SL127GW SL517G SL537G



IADC	Recommendation		Application Formation
	WOB(KN/mm)	RPM(r/min)	
517 537	0.4~1.0	120~60	Soft formations with low compressive strength and high drillability, such as: mudstone, gypsum, salinastone, soft shale, soft limestone, etc.
117 127	0.35~0.9	150~70	Soft to medium formations with low compressive strength, such as: medium soft shale, hard gypsum, medium soft limestone, medium soft sandstone, soft formation with harder interbeds, etc.

Note: The upper limits of WOB and RPM in above table should not be used simultaneously.

OPTINAL FEATURES

Diamond Compacts(GG) ----->

For high abrasive formations, the diamond compacts can enhance the gauge protection



<----- Six-Point Position Stabilization Structure (SV)

Bit leg back is designed with specific integrated structure that allows nozzle boss and leg to contact with borehole wall, realizing Six-point position stabilization, which makes the drilling more stable, avoids teeth overload, and achieve a high-quality well bore.

Widened Creast Insert (K) ----->

The widened creast insert is 15% wider than standard insert. It can cut more rocks as penetrating so as to increase the ROP.

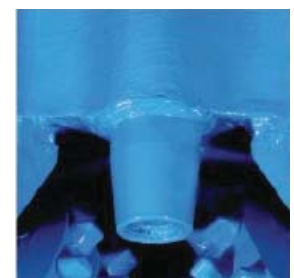


<----- Shirttail Protection (G)

More tungsten carbide inserts are placed in the shirttail to reduce the wear in the abrasive formation. It can protect gauge and increase stability.

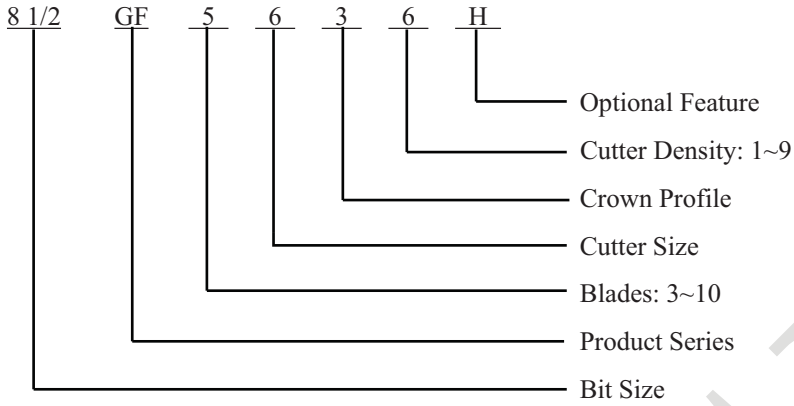
Extended Nozzle (E) ----->

The extended nozzle can provide better hydraulics for the bit and increase the ROP in the soft formation.



DIAMONDS BITS

PDC Bit Type

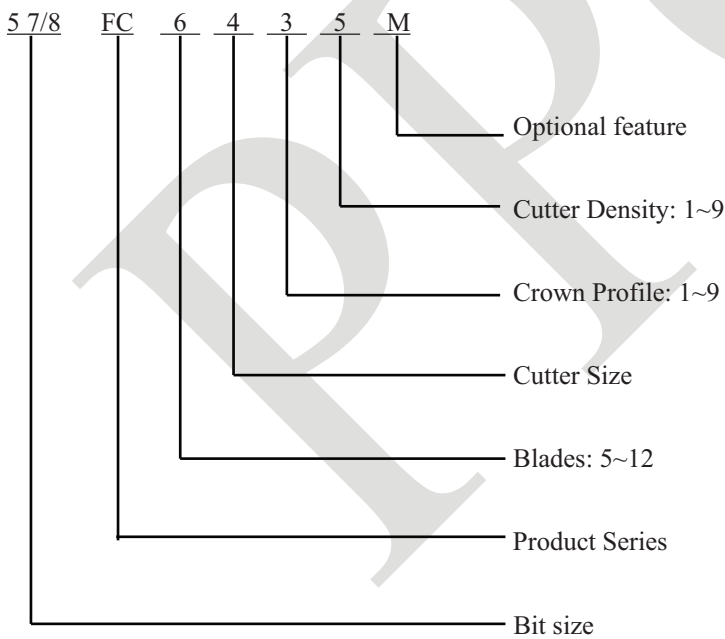


B	Bi-center
H	2-row Back-up Cutter
S	Spiral Blade
U	Updrill
K	Wear Knot

1-91-long parabolie 9-Flat		
6	Φ 19mm	3/4in
5	Φ 16mm	5/8in
4	Φ 13mm	1/2in
3	< Φ 10mm	3/8in

F	Standard Compacts Series
GF	Premium Compacts Series

Core Bit Type



U	Updrill
M	Sealing Core

FC	1-9 1-Long parabolic 9-Flat
TC	N/A
NC	N/A

FC	6	Φ 19mm
	5	Φ 16mm
	4	Φ 13mm
	3	< Φ 10mm
TC NC	5	Cylindrical Polycrystalline
	4	Triange Polycrystalline
	3	8-12 particles/ct
	2	6-8 particles/ct
	1	4-6 particles/ct

FC	PDC Core Bit
NC	Natural diamond core Bit
TC	Ballaset Core Bit
MC	Impregnated Core Bit

Note: The unlisted bit types can be made under customers' requirements.

PDC BIT SERIES



GF4434

- Light Cutter Density: Applicable to soft and sticky formations with low compressive strength.
- Short Parabolic Profile: Short parabolic profile can increase penetration rate. The unique design can balance the load distribution on the nose.
- Strengthened Cutter Density: The design can generate longer cuttings during the drilling.
- Tungsten Carbide Matrix: This kind of matrix can minimize the surface erosion of bit, and is suitable for high flow application without erosion of matrix materials.

Bit Specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
6	M332	4	4	1/2	1.5	4.1	3 1/2
8 1/2	M332	4	4	1/2	2	16.8	4 1/2

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
6	14~25	60~240	8~45
8 1/2	25~38	60~240	20~100

GF4654

- Soft Formation application: 4 blades, and the cutter arrangement suitable for drilling in soft formation with low compressive strength.
- Prolonged Bit Life: The self-stabilization design reduce the vibration of bit and the damage to the cutters, thereby prolonging the service life of bit.
- High ROP: Unique cutter layout and location can keep cutting edge sharp to obtain the maximum ROP.
- Multi-function Hydraulics: The deep-blade design can get high ROP in soft formations and can better cool the bit in the hard and abrasive formations.

Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
8 1/2	M121	4	4	3/4	3	18.3	4 1/2
9 1/2	M121	4	4	3/4	3.5	29.2	6 5/8
12 1/4	M121	4	4	3/4	3.5	45.6	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
8 1/2	25~38	60~240	13~66
9 1/2	30~44	60~250	13~90
12 1/4	38~60	60~250	13~100

GF5636 & GF5644H

- Soft to medium-hard Formation Drilling: 5-blade structure is suitable for soft to medium-hard formations, and GF technology extends the application range to hard formation.
- Anti-whirl Technology: The advanced simulation technology enables the bit more stable in drilling. It can drill interbedded formations without serious break and wear as conventional PDC design.
- Tapered Blade: Strengthened blade and lengthened junk slot can get high ROP in soft formations and cool the bit efficiently in the hard and abrasive formations.



Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
8 1/2	M221	5	5	3/4	3	18	4 1/2
9 1/2	M221	5	5	3/4	3.5	25.6	6 5/8
12 1/4	M221	5	7	3/4	3	41.4	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
8 1/2	25~38	60~330	13~49
9 1/2	30~44	60~300	13~80
12 1/4	38~60	60~300	17~98

GF6645

- Soft to Medium-hard formation Drilling: 5-blade structure is suitable for soft to medium-hard formations, and GF technology extends the application range to hard formations.
- Anti-whirl Technology: The advanced simulation technology makes the bit more stable in downhole drilling. It can drill interbedded formations without serious break and wear as conventional PDC design.
- Tapered Blade: Strengthened blade and lengthened junk slot can reach high ROP in soft formations and cool the bit efficiently in hard and abrasive formations.

Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
8 1/2	M221	6	5	1/2	3	18	4 1/2
9 1/2	M221	6	5	1/2	3.5	25.6	6 5/8
12 1/4	M221	6	7	1/2	4	41.4	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
8 1/2	25~38	60~330	13~49
9 1/2	30~44	60~300	13~80
12 1/4	38~60	60~300	17~98

GF6445

- High ROP: Unique cutter arrangement and location can keep the cutting edge sharp in drilling to obtain the maximum ROP.
- Spiral and Asymmetric Blade Design: Specific cutter arrangement enhances the bit stability, and can achieve long service life in interbedded formation drilling.
- Multi-function Hydraulics: The deep slot and straight blade design can get high ROP in soft formations and can cool the bit efficiently in hard and abrasive formations.



Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN

5	M332	6	4	1/2	2	9.4	3 1/2	6	14~25	60~400	8~45
8 1/2	M332	6	6	1/2	3	16	4 1/2	8 1/2	25~38	60~300	20~100
12 1/4	M334	6	6	1/2	4	36.9	6 5/8	12 1/4	25~56	60~240	22~150

GF6637

- Medium parabolic crown profile and heavy-density cutter arrangement can get high ROP in medium to hard abrasive formations with medium compressive strength.
- Deep blade can get high ROP in soft to medium hard formation and effectively cool the bit in hard and abrasive formations.
- Highly intensified gauge design can get a long service life in the hard and abrasive formations.

Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
8 1/2	M323	6	6	3/4	3	15.6	4 1/2
9 1/2	M323	6	6	3/4	3.5	20.2	6 5/8
12 1/4	M323	6	8	3/4	4	30	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
8 1/2	25~38	60~330	13~75
9 1/2	28~44	60~350	13~88
12 1/4	38~60	100~350	22~111

GF7457H

- Hard Formation Drilling: Medium parabolic crown profile and heavy-density cutter arrangement can get high ROP in medium to hard abrasive formations with high compressive strength.
- High ROP: Unique cutter arrangement and location can keep the cutting edge sharp in drilling to obtain the maximum ROP.
- Multi-function Hydraulics: The deep slot and straight blade design can get high ROP in medium-hard to hard formations and cool the bit efficiently in hard and abrasive formations.



Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
5	M333	7	5	1/2	2	5	3 1/2
8 1/2	M432	7	6	1/2	3	16	4 1/2
9 1/2	M433	7	6	1/2	3.5	16.2	6 5/8
12 1/4	M433	7	8	1/2	4	36.9	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
6	14~25	60~350	8~45
8 1/2	25~38	60~350	13~115
9 1/2	30~44	60~350	17~129
12 1/4	38~60	60~350	22~160

GF8447HU

- Hard Formation Application: Short parabolic crown profile and medium density cutter layout provide the superior ROP in soft to medium formations with abrasive interbeds.
- High ROP: Unique cutter arrangement and location can keep the cutting edge sharp in the drilling to Obtain the maximum ROP.
- Maximum Durability: The integrated cutter density design provides durability in the hard formation application.
- Multi-function Hydraulics: The deep slot and straight blade design can get high ROP in medium-hard to hard formations and cool the bit efficiently in hard and abrasive formations.



Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
6 1/2	M433	6	3~4	1/2	2.5	5.09	3 1/2
8 1/2	M433	8	6~8	1/2	3	11	4 1/2
12 1/4	M433	8	7~10	1/2	4	17.6	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
6 1/2	10~16	60~240	8~45
8 1/2	28~38	60~300	20~100
12 1/4	38~56	60~350	44~178

GF8435

- High ROP: Unique cutter arrangement and location can keep the cutting edge sharp in the drilling to obtain the maximum ROP.
- High ROP: Unique cutter layout and back rake plot can keep cutting edge sharp in the drilling to obtain the maximum ROP.
- Multi-function Hydraulics: The deep blade design can get the high ROP in medium to hard formations and can better cool the bit in the hard and abrasive formations.
- Longer Bit Life: The self-stabilization design reduce the vibration of bit and the damage to the cutters, thereby prolonging the service life of bit.



Bit specification							
Size	IADC	Blades	Nozzles	Cutter Size	Gauge Length	Junk Slot Volume	API Pin
in				in	in	in ²	in
6	M332	6	4	1/2	1.5	4.1	3 1/2
8 1/2	M332	8	6~8	1/2	2	16.8	4 1/2
12 1/4	M332	8	6~8	1/2	4	17.1	6 5/8

Recommendation Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
6	14~25	60~240	8~45
8 1/2	25~38	60~240	20~100
12 1/4	25~56	60~350	22~150

CORE BIT SERIES



NC201 & NC202U

- Double-cone crown profile, and medium-size natural diamond cutters.
- Collector fluid courses or face discharge is optional.
- Applicable for soft to medium formations.

Bit specification		
Size	TFA	Gauge Length
in	in ²	in
5 7/8	0.1~1.0	1
6	0.1~1.0	1
8 1/2	0.2~1.5	1~1.5

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~75
6	6~13	60~350	23~75
8 1/2	22~32	350~500	45~110

FC1035 & FC475

- Arc crown profile design and blades cutter setting.
- Natural diamond ID & OD gauge, fluid courses set on ID gauge to ensure a better cleaning and cooling effect upon cutters of the gauge.
- Applicable for medium hard formations and it allows to be used in various formations.

Bit Specification		
Size	TFA	Gauge Length
in	in ²	in
5 7/8	0.3~0.8	1 1/8
6	0.3~0.8	1 1/8
8 1/2	0.6~1.2	1 1/2

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~75
6	6~13	60~350	23~75
8 1/2	22~32	350~500	45~110



FC6435M

- Applicable for medium to hard formations.
- Medium-short parabolic crown profile, blades cutter setting and medium to heavy cutter density can be used in medium to hard formations with low compressive strength and little abrasiveness.
- A better mechanical ROP in formations.

Bit Specification			
Size	TFA	Cutter Size	Gauge Length
in	in ²	in	in
5 7/8	0.2~0.6	0.315	1
6	0.2~0.6	0.315	1
8 1/2	0.2~1.0	0.5	1~1.5

TC206

- Double-cone crown profile, and medium-size natural diamond cutters.
- Natural diamond ID & OD gauge, and collector fluid coursed on ID gauge.
- Applicable to medium to medium hard formations, such as: sandstone, limestone and dolomite.

Bit Specification		
Size	TFA	Gauge Length
in	in ²	in
5 7/8	0.15~1.0	1
6	0.15~1.0	1
8 1/2	0.2~1.5	1 1/2

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~75
6	6~13	60~350	23~75
8 1/2	10~32	350~500	45~113

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~68
6	6~13	60~350	23~68
8 1/2	22~32	350~500	45~90

TC209

- Arc crown profile.
- Natural diamond ID & OD gauge.
- Fluid courses with ID flow or face discharge ports are optional.
- Applicable to medium hard formations.

MC309

- Arc crown profile and self-sharpening impregnated segments.
- Applicable for extremely hard and abrasive formations such as quartz sandstone, etc.
- Recommendation for high rotary speed.
- Radial fluid design.

Bit Specification		
Size	TFA	Gauge Length
in	in ²	in
5 7/8	0.18~1.0	1
6	0.18~1.0	1
8 1/2	0.2~1.5	1 1/2

Bit Specification		
Size	TFA	Gauge Length
in	in ²	in
5 7/8	0.1~1.0	1 1/8
6	0.1~1.0	1 1/8
8 1/2	0.5~1.5	1 7/16

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~68
6	6~13	60~350	23~68
8 1/2	22~32	350~500	45~90

Recommended Drilling Parameters			
Size	Flow Rate	RPM	WOB
in	L/s	rpm	KN
5 7/8	6~13	60~350	23~75
6	6~13	60~350	23~75
8 1/2	22~32	350~500	45~110

OPTIONAL FEATURES

Updrill Cutters(A) ----->

The updrill cutters can efficiently solve the problem of hole shrinkage in the sloughing and instable formations.



Natural diamond Updrill ----->

Natural diamond gauge protection can enhance the gauge durability of bit in the abrasive formations.



< -----Wear Knot(K)

Insertion of the tungsten carbide wear knot behind the PDC cutters can control the cutting depth and effectively reduce the torque change.





Sealing core (M) ----->

It can ensure the core recovery in the fractured formations.

< ----- **2-row Back-up cutters(H)**

This kind of cutters enhances the wear resistance of bit and prolongs the bit life effectively.



TECHNICAL DATA



ROLL CONE BIT SIZE API PIN CONNECTION

TCI BIT SIZE

Bit Size		API PIN	Weight(kg)
in	mm		
3 1/2	88.9	2 3/8	5.0
4 5/8	117.5	2 7/8	6.5
4 3/4	120.3	2 7/8	7.0
5 1/2	139.7	3 1/2	17.0
5 7/8	149.2	3 1/2	18
6	152.4	3 1/2	19.5
6 1/4	156.6	3 1/2	19.5
6 1/2	165.1	3 1/2	19.5
6 3/4	171.4	3 1/2	21.0
7 1/2	190.5	4 1/2	28.0
7 7/8	200.0	4 1/2	29.5
8 1/4	209.5	4 1/2	38.0
8 3/8	212.7	4 1/2	38.0
8 1/2	215.9	4 1/2	38.0
8 3/4	222.2	4 1/2	40.0
9 5/8	235.0	4 1/2	60.0
9 1/2	241.3	6 5/8	57.5
9 7/8	250.8	6 5/8	60.0
10 5/8	269.9	6 5/8	74.0
11	279.4	6 5/8	85.0

STEEL TOOTH BIT SIZE

Bit Size		API PIN	Weight(kg)
in	mm		
4 5/8	117.5	2 7/8	6
4 3/4	120.6	2 7/8	6.5
5 3/4	146.1	1 1/2	16.5
5 7/8	149.2	3 1/2	17.0
6	152.4	3 1/2	18.0
6 1/4	158.7	3 1/2	19.0
6 1/2	165.1	3 1/2	19.0
6 3/4	171.4	3 1/2	19.0
7 1/2	190.5	4 1/2	26.5
7 7/8	200.0	4 1/2	29.0
8 3/8	212.7	4 1/2	35.0
8 1/2	215.9	4 1/2	35.0
8 3/4	222.2	4 1/2	36.0
9 1/2	241.3	6 5/8	58.0
9 5/8	244.5	6 5/8	57.5
9 7/8	250.8	6 5/8	57.0
10	254.0	6 5/8	60.0
10 5/8	269.9	6 5/8	66.0
11	279.4	6 5/8	75.0
11 5/8	295.3	6 5/8	83.0

11 5/8	295.3	6 5/8	89.0
12 1/8	308.0	6 5/8	94.0
12 1/4	311.1	6 5/8	97.0
12 15/32	320.0	6 5/8	95.0
13 1/8	333.4	6 5/8	120.0
13 5/8	346.1	6 5/8	120.0
13 3/4	349.3	6 5/8	120.0
14 5/8	355.6	6 5/8	160.0
14 3/4	374.6	7 5/8	160.0
15 1/2	393.7	7 5/8	189.0
16	406.4	7 5/8	205.0
17 1/2	444.5	7 5/8	255.0
20	508.0	7 5/8	443.0
26	660.4	7 5/8	810.0

12 1/4	311.1	6 5/8	85.0
13 5/8	342.9	6 5/8	118.0
13 3/4	349.3	6 5/8	110.0
14 3/4	374.6	7 5/8	140.0
15	381	7 5/8	150.0
15 1/2	393.7	7 5/8	175.0
16	406.4	7 5/8	179.0
17 1/2	444.5	7 5/8	230.0
20	508.0	7 5/8	428.0
22	558.0	7 5/8	520.0
24	609.0	7 5/8	585.0
26	660.4	7 5/8	720.0
36	914.4	8 5/8	1850.0

API ROLLER CONE BIT TOLERANCE

Bit Size	Tolerance
in	mm
3 3/8 ~ 13 3/4	0 ~ +0.794
14 ~ 17 1/2	0 ~ +1.588
≥17 5/8	0 ~ +2.381

API DIAMOND BIT TOLERANCE

Bit Size	Tolerance
in	mm
≤6 3/4	0 ~ -0.38
6 25/32 ~ 9	0 ~ -0.51
9 1/32 ~ 13 3/4	0 ~ -0.76
≥13 25/32	0 ~ -1.14

RECOMMENDED ROLLER CONE BIT MAKE-UP TORQUE

API PIN	Recommended Torque
in	N • m
2 3/8	4,100 ~ 4,700
2 7/8	6,100 ~ 7,500
3 1/2	9,500 ~ 12,200
4 1/2	16,300 ~ 21,700
6 5/8	38,000 ~ 43,400
7 5/8	46,100 ~ 54,200
8 5/8	54,200 ~ 81,300

RECOMMENDED ROLLER CONE BIT MAKE-UP TORQUE

Bit Size	API PIN	Recommended Torque
in	in	N • m
3 1/2 ~ 4 1/2	2 3/8	4,200 ~ 4,600
4 17/32 ~ 5	2 7/8	6,200 ~ 6,900
5 1/32 ~ 7 7/8	3 1/2	10,400 ~ 11,500
7 13/32 ~ 9 3/8	4 1/2	22,400 ~ 24,400
9 13/32 ~ 14 1/2	6 5/8	50,300 ~ 57,500
14 9/16 ~ 18 1/2	7 5/8	65,500 ~ 71,900

ROLLER CONE BIT NOZZLE AND ASSEMBLY SIZES

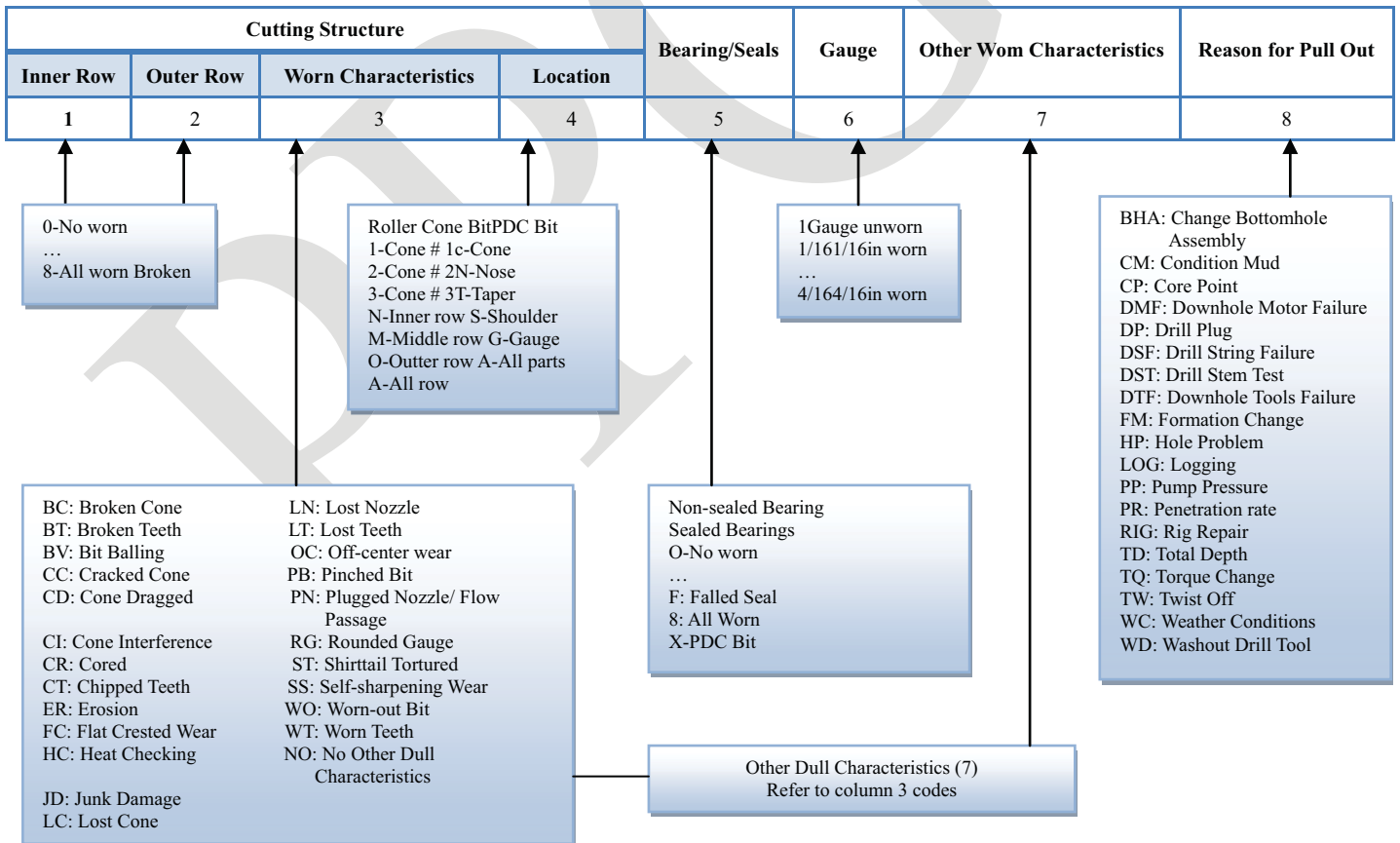
Bit Size		Nozzle OD	Assembly Length	Nozzle Jetting ID
in	mm	mm	mm	mm
3 1/2 ~ 5 1/2	88.9 ~ 139.7	20.3	17.5	4 ~ 10
5 5/8 ~ 7 3/8	142.9 ~ 187.3	23.6	19.0	5 ~ 16
7 1/2 ~ 8 1/4	190.5 ~ 209.6	29.8	21.0	7 ~ 18
8 3/8 ~ 14 5/8	212.7 ~ 371.5	33.0	27.0	8 ~ 20
≥14 3/4	≥374.6	40.9	27.0	10 ~ 22

Note: Assembly length means the distance from inlet to the inlet of retaining ring slot.

TOTAL FLOW AREA CHART OF DIAMOND BITS

Nozzle Size		Number of Nozzles									
1/32in	mm	1	2	3	4	5	6	7	8	9	10
		TFA(in ²)									
7	5.56	0.0376	0.0752	0.1127	0.1503	0.1877	0.2255	0.2631	0.3007	0.3382	0.3758
8	6.35	0.0491	0.0982	0.1473	0.1963	0.2454	0.2945	0.3435	0.3927	0.4418	0.4909
9	7.14	0.0621	0.1242	0.1864	0.2485	0.3106	0.3728	0.4249	0.4970	0.5591	0.6213
10	7.94	0.0767	0.1534	0.2301	0.3060	0.3835	0.4602	0.5369	0.6136	0.6903	0.7670
11	8.37	0.0928	0.1856	0.2784	0.3712	0.4640	0.5568	0.6496	0.7424	0.8353	0.9281
12	9.53	0.1104	0.2209	0.3313	0.4418	0.5522	0.6627	0.7721	0.8836	0.9940	1.1045
13	10.32	0.1296	0.2592	0.3889	0.5185	0.6481	0.7777	0.9073	1.0370	1.1666	1.2962
14	11.11	0.1503	0.3007	0.4510	0.6013	0.7517	0.9020	1.0523	1.2026	1.3530	1.5033
15	11.91	0.1726	0.3451	0.5177	0.6903	0.8629	1.0354	1.2080	1.3806	1.5532	1.7258
16	12.70	0.1963	0.3927	0.5890	0.7854	0.9817	1.1781	1.3744	1.5708	1.7671	1.9634
18	14.29	0.2485	0.4970	0.7455	0.9940	1.2425	1.4910	1.7395	1.9880	2.2365	2.4850
20	15.88	0.3068	0.6136	0.9204	1.2272	1.5340	1.8408	2.1476	2.4544	2.7612	3.0680
22	17.46	0.3712	0.7424	1.1137	1.4829	1.8561	2.2273	2.5986	2.9698	3.3410	3.7122

IADC BIT WEAR GRADING



COMPARISON CHART OF ROLLER CONE BIT TYPES

Steel Tooth Bit			Standard Roller Bearing 1		Sealed Roller Bearing 2		Sealed Roller Bearing Gauge Protection 5		Sealed Journal Bearing 6		Sealed Journal Bearing Gauge Protection 7	
No	Lithology	Class	Chuanshi	Jianghan	Chuanshi	Jianghan	Chuanshi	Jianghan	Chuanshi	Jianghan	Chuanshi	Jianghan
1	Soft Formations with low compressive strength and high drillability	1	S111	W111	S114	GA114	S115 SG115	GA115 GJ115	S116	HA116	S117 SJ117	HA117 HJ117
		2	S121	W121	S124	GA124	S125 SG125	GA125	S126	HA126	S127 SJ127	HA127 HJ127 FJ127
		3	S131	W131	S134	GA134	S135 SG135	GA135 GJ135	S136	HA136	S137 SJ137	HA137 HJ137
		4										
2	Medium to Medium hard formations with high compressive strength	1	S211		S214	GA214	S215 SG215	GA215	S216	HA216	S217	HA217
		2										
		3										
		4	S241		S244				S246		S247	
3	Medium abrasive formations and abrasive hard formations	1										
		2	S321	W321	S324							
		3										
		4										

Note: 1.The characteristics and optional features of cone gauge trimmer (T) is omitted in the chart.

2. The unlisted bit types can be made upon customers' specific drilling requirements.

COMPARISON CHART ROLLER CONE BIT TYPES

Steel Tooth Bit			Air-cooling Roller Bearing 1		Sealed Roller Bearing Gauge protection 2		Sealed Journal Bearing 6		Sealed Journal Bearing Gauge protection 7	
No	Lithology	Class	Chuanshi	Jianghan	Chuanshi	Jianghan	Chuanshi	Jianghan	Chuanshi	Jianghan
4	Extremely soft formations with low compressive strength	1				GA415 GJ415			S417 SJ417	HA417 HJ417
		2								
		3			S435 SG435	GA435 GJ435			S437 SJ437	HA437 HJ437 FJ437
		4								
5	Soft to medium hard formations with low compressive strength	1	SK512		S515 SG515	GA515 GJ515			S517 SJ517 SV517	HA517 HJ517 MO517 FJ517
		2			S525 SG525				S527 SV527 SJ527	HA527
		3			S535 SG535	GA535 GJ535			S537 SV537 SJ537	HA537 HJ537 MO537 FJ537
		4	SK542		S545 SG545				S547 SV547 SJ547	HJ547
6	Medium hard formations with high compressive strength	1	SK612		SG615				S617 SJ617 SV617	HA617 HJ617 FJ617
		2			SG625				S627 SJ627	HA627 HJ627
		3		SG635					S637 SJ637	HA637 HJ637
		4								
7	Medium abrasive formations and abrasive hard formations	1								
		2								
		3	SK732							
		4								

Note: 1.The characteristics and optional features of cone gauge trimmer (T) is omitted in the chart.

2. The unlisted bit types can be made upon customers' specific drilling requirements.