



Diamond Contours

Full Round Crown

General purpose core bit. Performs well in a wide range of rock materials. Available in all commercial sizes.

Semi-Round Crown

Good all-around core bit. Performs well in hard rock. Also used in wire line core bits for drilling solid formations.

Semi-Flat Crown

Usually used for drilling soft, unconsolidated rock conditions.

Taper Crown

Ideal for coring in soft to medium hard rock. Used for conventional or wire line core bits.

Multi-Step Crown

Usually selected for core drilling hard rock with wire line core barrels.

Bottom Discharge Crown

Designed to minimize water contact with core, especially in soft rock coring.

Multi-Air & Fluid Crown

Generally used for fast cooling of the bit when coring medium-hard rock with air or heavy mud circulation.

Ring Diamond Reamer

Multi-spaced strips of diamonds used for long life in hard rock applications.

Strip Diamond Reamer

Four equally divided diamond inserts for soft rock applications.

Concave Crown

Special concave crown on non-coring bits. Used for wedging operations or for drilling blind holes in shales or limestone.

Pilot Crown

Special pilot crown on non-coring bits. Used for drilling drain holes, powder holes or redrilling grouted holes for pressure tests.

Diamond Bits

Diamond Bit Profiles



Full-round in which the crown radius equals 50 percent of the kerf width.



Semi-round in which the crown radius equals 60 percent to 70 percent of the kerf width.



Flat crown in which there is no radius.



Semi-flat in which the crown radius equals 100 percent of the kerf width.

**Bit contours above illustrate only a partial listing of the bit styles available from Acker Drill Co.*

Note: Kerf width is defined as the difference between O.D. and I.D. set dimensions divided by two. The step-type design, quite popular in recent years, is also available on request.

Silhouette: Showing DCDMA Standards.

Standard Tools are Satisfactory for Most Conditions

Conditions encountered vary so widely, and present so many different problems, that it is impossible to design a single type of bit for all-around operations. By a careful grouping of the elements essential to making a bit, it is possible to make a standard bit which will perform well under general drilling conditions.

Diamond Setting

All diamonds used in Acker bits are carefully selected and a high level of quality maintained at all times. The diamonds are hand-set in an oriented manner, setting the hardest vector of the diamond toward the work. Continuous inspection is carried on to insure that high standards of workmanship are maintained.

Diamond Size

The diamond size is generally dictated by the formation being drilled.

In softer formations, large diamonds will prevent the bit from blocking up. These large diamonds offer more resistance to shock when drilling fractured rock.

In hard fine-grained rock the hardness increases so it becomes necessary to use more and smaller diamonds. Additional stones provide more cutting "edge" and also distribute the added pressure more evenly over the face of the bit.

On the following pages you will note that several sizes of diamonds with their approximate carat weights are shown for each bit. Larger or smaller diamonds are available for special applications.

Matrix

The matrix has three functions to perform: It must securely hold the diamonds in their present pattern, Resist shock, and Dissipate heat away from the diamonds. While tests have shown that the Rockwell hardness scale is not always a true guide to abrasion resistance, it is the most commonly used. The Acker Drill Company has developed three matrices which have a greater resistance to abrasion without appreciably increasing the hardness scale readings.

The patent pending matrices used are:

B.M. A blended soft matrix.

A matrix for nonabrasive formations (20 to 30 RC)

A.R. Abrasion Resistant.

A special blended matrix used when drilling fractured or very abrasive formations. (30 to 40 RC)

H.M. A hard matrix.

Used in fairly abrasive formations. (40 to 50 RC)

Waterways

The most important function of the waterway in the diamond bit is to aid in flushing the cuttings. The number and size of the waterways used depend largely on the formation being drilled.

When drilling in shales or other soft formations, it is often desirable to use a multi-waterway bit. This design permits quick removal of the cuttings, and helps prevent blocking.

In harder rock, the finer size cuttings require less waterways while the need for greater diamond concentration increases. It is common here to use only two (2) waterways. In free cutting rock, when maximum diamond concentration is desired, no waterways are used.

As a general rule, the following combination of stone size and waterways are used:

10, 15 and 26 SPC4 waterways

44, 62 and more? Waterways

Reinforced Waterways

Tungsten carbide inserts set at the waterways are recommended for extremely abrasive or broken formations.

Grit Facing

Tungsten carbide grit facing is recommended for extremely abrasive formations for the "M" and "L" design bits to prevent the bit body from prematurely wearing thin.

Face Contours

There are many types of face contours currently used in bit design. The four most commonly used are defined by DCDMA as: full-round, semi-round, flat and semi-flat crowns.

Unless otherwise specified, the semi-round contour will be furnished.

DCDMA Standards

The above abbreviation stands for the Diamond Core Drill Manufacturers Association of which Acker Drill Co. is a charter member. This organization has standardized several sizes of diamond core bits throughout this reference. Otherwise all bits conform to the standards and tolerance as established by the Association.

Metric Diamond Core Bits

Acker manufactures a full line of metric size diamond core bits and reamers. Metric bits and reamers feature the same high quality of diamonds and manufacture as employed in DCDMA standards. Ask us to bid on your requirements and prove to your satisfaction—reduced cost per foot.

Acker Standard Diamond Coring Bits

The Acker standard coring bit design and construction have proven popular and most satisfactory for general purpose drilling assignments. On large or difficult coring jobs, Acker field technicians will be pleased to design a bit to meet your specific conditions and provide the lowest possible cost per foot.

Acker "M" Design Diamond Coring Bits

The DCDMA "M" Design core barrels and bits are used when coring soft, friable or broken formations. They are available with conventional waterways or bottom discharge design. Bottom discharge bits have internal water ports that permit the water to bypass the core and prevent erosion of soft materials.

Grit facing strips are available for coring in very abrasive formations and to avoid excess wear on the bit body.

Acker DCDMA Large Design Coring Bits

These bits are for use with DCDMA standardized large diameter design double tube core barrels for recovery of large diameter cores in rock-like material. They are available with internal waterways or with bottom discharge ports that allow the water to bypass the core. They are available with all the options of the Acker bits.

Wire Line System Diamond Bits

Diamond bits are stocked in standard sizes. The chart shows basic part numbers and diamond carat size. Four diamond grades are available as well as special features such as extra hard matrix, tungsten hard facing, and reinforced waterways. Many other competitive features are available on request. Consult Acker price lists for details...Please specify step-type or conventional crown.

Acker "WG" Design Core Bits					
West African Bortz					
Size	Part No.	Approx. Carat Weight			
		10-SPC	26-SPC	44-SPC	62-SPC
RWG	—	4.50	3.50	3.00	2.50
XRP*	20008-B	4.50	3.50	3.00	2.50
EWG	20001-B	8.00	6.00	5.00	4.50
AWG	20003-B	11.50	9.00	7.50	6.50
BWG	20006-B	15.00	11.50	9.50	8.50
NWG	20007-B	23.00	17.00	14.00	12.00
HWG	20172-B	35.00	28.00	22.00	20.00

**Optional sizes*

Acker "M" Design Core Bits*					
West African Bortz					
Size	Part No.	Approx. Carat Weight			
		10-SPC	26-SPC	44-SPC	62-SPC
EWM	20017-B	8.00	6.00	5.00	4.50
AWM	20018-B	11.50	9.00	7.50	6.50
BWM	20020-B	15.00	11.50	9.50	8.50
NWM	20021-B	23.00	17.00	14.00	12.00

**Please specify conventional or bottom discharge waterways when ordering.*

DCDMA Large Design Core Bits					
Size	Part No.		Approx. Carat Weight		
	Internal Discharge	Bottom Discharge	10-SPC	26-SPC	44-SPC
2-3/4" x 3-7/8" — (97.5 x 68.3 mm)	20035	20038	46.0	29.0	25.0
4" x 5-1/2" — (138.0 x 100.8 mm)	20036	20039	60.0	48.0	42.0
6" x 7-3/4" — (194.4 x 151.6 mm)	20037	20040	95.0	75.0	65.0

Wire Line Diamond Core Bits									
Symbol Size	Part No.	No. of Steps	Step-Type Surface Set Crown				Conventional Crown		
			Carat Weight				Carat Weight		
			10-SPC	26-SPC	44-SPC	62-SPC	26-SPC	44-SPC	62-SPC
AWL	20048	2	20.00	16.00	14.00	12.00	14.00	9.00	8.00
BWL	20049	3	25.00	21.50	18.00	16.00	16.00	14.00	12.00
NWL	20050	4	34.00	26.00	21.00	19.00	22.00	19.00	17.00
HWL	20129	4	60.00	41.00	24.00	21.00	36.00	22.00	20.00
PWL	20132	4	80.00	52.00	36.00	28.00	48.00	34.00	30.00

Diamond Bits

"W" Design Carbide Insert Flush Joint Casing

Size	Shoes Part No.	Casing Bit Part No.
EW	300870-2	300880-2
AW	300871-2	300881-2
BW	300872-2	300882-2
NW	300873-2	300883-2
HW	300874-2	300884-2
PW	300875-2	300885-2
SW	300876-2	300886-2
UW	300877-2	300887-2
ZW	300878-2	300888-2

Acker Diamond Casing Shoes and Bits— "W" Design

Acker surface set diamond casing shoes and bits are available for the approved DCDMA flush joint "W" design casing. "W" casing bits and shoes are only available with box thread connections. Casing bits and shoes have a standard pin thread connection. Box threads are available on request.

Acker Carbide Insert Casing Shoes and Bits—"W" Design

Available in all standard sizes for DCDMA "W" Design casing. The carbide insert is a very economical bit for spinning in casing through soft rock strata or where casing is left in the hole. More economical than diamonds, the carbides withstand shock loads when drilling overburden. Carbides may not be sharpened and are usually run to destruction. There is no salvage value.

DCDMA "W" Design Diamond Casing Shoes

Casing Size	Surface Set Part No.	Carat Weight		
		10-SPC	26-SPC	44-SPC
RW	20439	*	*	*
EW	20440	10.00	7.00	6.00
AW	20441	13.00	9.00	7.00
BW	20442	18.00	13.00	11.00
NW	20443	23.00	18.00	15.00
HW	20444	38.00	27.00	23.00
PW	20445	*	*	*
SW	20446	*	*	*
UW	20447	*	*	*
ZW	20448	*	*	*

*Information on application.

Casing Shoes

The casing shoe is generally used in casing overburden where the "spun in" casing cannot be removed without the hole casing. For this problem, the casing shoe is designed without diamonds on the radius. This allows the shoe bit to stay in place at the bottom of the casing and accommodate other tools passing through the shoe without danger of being destroyed by the diamonds in the bit. After operations are completed, the shoe is recoverable.

DCDMA "W" Design Diamond Casing Bits

Casing Size	Surface Set Part No.	Carat Weight		
		10-SPC	26-SPC	44-SPC
RW	20481	*	*	*
EW	20482	13.00	9.00	7.00
AW	20483	20.00	14.00	12.00
BW	20484	26.00	18.00	15.00
NW	20485	30.00	22.00	20.00
HW	20486	40.00	28.00	25.00
PW	20487	*	*	*
SW	20488	*	*	*
UW	20489	*	*	*
ZW	20490	*	*	*

*Information on application.

Casing Bits

A casing bit is usually set with diamonds and used to rotate the casing into solid materials where it can be withdrawn without the hole casing in for the purpose of cementing other casing into place. The diamond casing bit has both inside and outside diamonds to facilitate making a hole with clearance as well as using the casing as a drill tube.

Acker Standard Carbide Insert Coring Bits

Size	"G" Design Part No.	"M" Design Part No.
EWG/M	301637-2	300123-2
AWG/M	301638-2	300090-2
BWG/M	301639-2	300028-2
NWG/M	301640-2	300061-2

Note: Size XRP is available on request.

Acker Carbide Coring Bits Large Design

Large Design Size	Carbide Insert	
	Internal Discharge	Bottom Discharge
2-3/4 x 3-7/8	300832-2	300833-2
4 x 5-1/2	300838-2	300839-2
6 x 7-3/4	300844-2	300845-2

Specify part numbers when ordering.

Diamond Type Wire Line Reaming Shells

Size	Reaming Shell Balanced Ring	
	Part No.	Ct. Wt.
AWL	20295	5.5
BWL	20296	6.5
NWL	20297	8.0
HWL	20704	10.0
PWL	20705	12.0

Single Tube—Double Tube—"M" and Wire Line Design

Reaming shells containing diamonds either in vertical strips or in the balanced ring design and are available for use with all standard size and "M" design bits and core barrels. Acker reaming shells are also available for core barrels of other makes (Give size, manufacturer, etc. when ordering.)

The reaming shell protects the core barrel from wear and maintains the gauge of the hole. Four types of reaming shells are available: The strip type, the balanced ring type, and the carbide insert or hard faced type.

Job conditions and drillers' preference usually dictate the type used.

Acker Standard Carbide Insert Core Bits

The carbide inserts are arranged in a conventional pattern to provide ample inside and outside cutting clearance for coring. This bit is widely used for gumbo tills and soft shales. The new larger inserts increase effectiveness and contribute to longer bit life. The carbides may be resharpened, however, the bit is generally used to destruction.

Large Design DCDMA Carbide Bits Standard and Pyramid Types

At a considerable saving over diamond bits, Acker makes available a very successful quality bit in both carbide insert and pyramid type for drilling soft rock. Carbides are set to provide maximum cutting. There is no salvage to this type bit, therefore, it is run to destruction. There is no salvage value.

Hard Faced Reaming Shells

Size	Single Tube Shells	Double Tube Shells	"M" Type Shells
	Part No.	Part No.	Part No.
EWG	301763	—	—
AWG	301719	301768	—
BWG	301685	—	301765
NWG	101587-2	—	300916
HWG	*	*	*

*On Request

Standard Large Design Reaming Shells

Size	Diamond Ring Type		Carbide
	Part No.	Ct. Wt.	Part No.
2-3/4 x 3-7/8	20257-R	9.0	300971
4 x 5-1/2	20258-R	16.0	300975
6 x 7-3/4	20259-R	20.0	200999

Standard Single Tube Reaming Shells

Size	Diamond Strip Type		Diamond Ring Type		Carbide
	Part No.	Ct. Wt.	Part No.	Ct. Wt.	Part No.
EWG	20723-S	2.25	20723-R	3.75	301676
AWG	20724-S	3.00	20724-R	4.50	301677
BWG	20725-S	3.00	20725-R	6.50	301678
NWG	20726-S	3.00	20726-R	7.50	301679
HWG	20823-S	6.0	20823-R	*	*

*On Request.

Standard Double Tube Reaming Shells

Size	Diamond Strip Type		Diamond Ring Type		Carbide
	Part No.	Ct. Wt.	Part No.	Ct. Wt.	Part No.
EWG	20727-S	2.25	20727-R	3.75	301680
AWG	20728-S	3.00	20728-R	4.50	301681
BWG	20729-S	3.00	20729-R	6.50	301682
NWG	20730-S	3.00	20730-R	7.50	301683
HWG	20816-S	6.0	20816-R	*	*

*On Request.

Standard "M" Design Reaming Shells

Size	Diamond Strip Type		Diamond Ring Type		Carbide
	Part No.	Ct. Wt.	Part No.	Ct. Wt.	Part No.
EWM	20248-S	2.25	20248-R	3.75	300319
AWM	20249-S	3.00	20249-R	4.50	300320
BWM	20251-S	3.00	20251-R	6.50	300175
NWM	20252-S	3.00	20252-R	7.50	300169

Diamond Bits



Reference and Specifications Chart

All Acker Diamond Bits and Reaming Shells conform to the standards set forth by the Diamond Core Drill Manufacturers Association (DCDMA).

The "WG" design, "WM" design and the large design are validated by DCDMA and the American National Standards Institute.

Size	Diamond Core Bits				Reaming Shells			
	Nominal Core Diameter		Nominal Hole Diameter		Set Dimensions +/- .005		Set Dimensions +/- .005	
	Inches	mm	Inches	mm	O.D.	I.D.	O.D.	mm
RW	3/4	19.0	1-1/8	28.5	1.160	.735	1.175	29.8
XRP*	7/8	21.1	1-5/16	33.3	1.295	.875	1.310	33.2
EX-EWG	7/8	21.2	1-1/2	37.7	1.470	.845	1.485	37.7
EXM-EWM	7/8	21.2	1-1/2	37.7	1.470	.845	1.485	37.7
AX-AWG	1-1/8	30.0	1-7/8	48.0	1.875	1.185	1.890	48.0
AXM-AWM	1-1/8	30.0	1-7/8	48.0	1.875	1.185	1.890	48.0
BX-BWG	1-5/8	42.0	2-3/8	59.9	2.345	1.655	2.360	59.9
BXM-BWM	1-5/8	42.0	2-3/8	59.9	2.345	1.655	2.360	59.9
NW-NWG	2-1/8	54.7	3	75.7	2.965	2.155	2.980	75.7
NXM-NWM	2-1/8	54.7	3	75.7	2.965	2.155	2.980	75.7
HX-HWG	3	76.2	3-7/8	98.8	3.890	3.000	3.907	99.2
2-3/4 x 3-7/8	2-3/4	68.3	3-7/8	98.8	3.840	2.690	3.875	98.4
4 x 5-1/2	4	100.8	5-1/2	139.6	5.435	3.970	5.495	139.6
6 x 7-3/4	6	151.6	7-3/4	196.8	7.655	5.970	7.750	196.9

*Optional Sizes

Size	Casing Bits				Casing Reaming Shell			Casing Shoes			
	Nominal Core		Nominal Hole		Set Dimensions		Dimensions		Set Dimensions		
	Inches	mm	Inches	mm	O.D.	I.D.	O.D.	Inches	mm	O.D.	I.D.
EX-EW	1-13/32	36.7	1-7/8	47.6	1.875	1.405	1.890	1-29/32	48.0	1.875	1.495
AX-AW	1-25/32	45.2	2-3/8	60.0	2.345	1.780	2.360	2-3/8	59.9	2.345	1.900
BX-BW	2-7/32	56.3	3	76.2	2.965	2.215	2.980	2-31/32	75.6	2.965	2.370
NX-NW	2-27/32	72.2	3-1/2	88.9	3.615	2.840	3.630	3-5/8	92.2	3.615	2.992
HX-HW	3-25/32	96.0	4-5/8	117.4	4.625	3.777	—	—	—	4.625	3.925
PW	4-5/8	117.4	5-21/32	143.6	5.650	4.633	—	—	—	5.650	4.778
SW	5-51/64	147.2	6-51/64	172.6	6.790	5.633	—	—	—	6.790	5.778
UW	6-13/16	173.0	7-13/16	198.4	7.800	6.755	—	—	—	7.800	6.905
ZW	7-29/32	200.8	8-13/16	223.8	8.810	7.755	—	—	—	8.810	7.905

Plug Bits			
Size	Hole Diameter		Set Dimensions
	Inches	mm	
XRP	1-1/4	31.7	1.295
EWG	1-1/2	38.1	1.470
AWG	1-7/8	47.6	1.875
BWG	2-3/8	60.3	2.345
NWG	3	76.2	2.965

Wire Line Bits							
Size	Nominal Hole Diameter		Nominal Core Diameter		Standard Set O.D. Dimension	Reaming Shell Set O.D. Dimension	Set I.D. Dimension
	Inches	mm	Inches	mm	In. (Approx.)	In. (Approx.)	In. (Approx.)
AWL	1-57/64	48.0	1-1/16	27.0	1.875	1.890	1.062
BWL	2-23/64	60.0	1-7/16	36.5	2.345	2.360	1.437
NWL	2-63/64	75.8	1-7/8	47.6	2.965	2.980	1.875
HWL	3-25/32	96.0	2-1/2	63.5	3.766	3.782	2.500
PWL	4-53/64	122.6	3-11/32	85.0	4.805	4.827	3.343