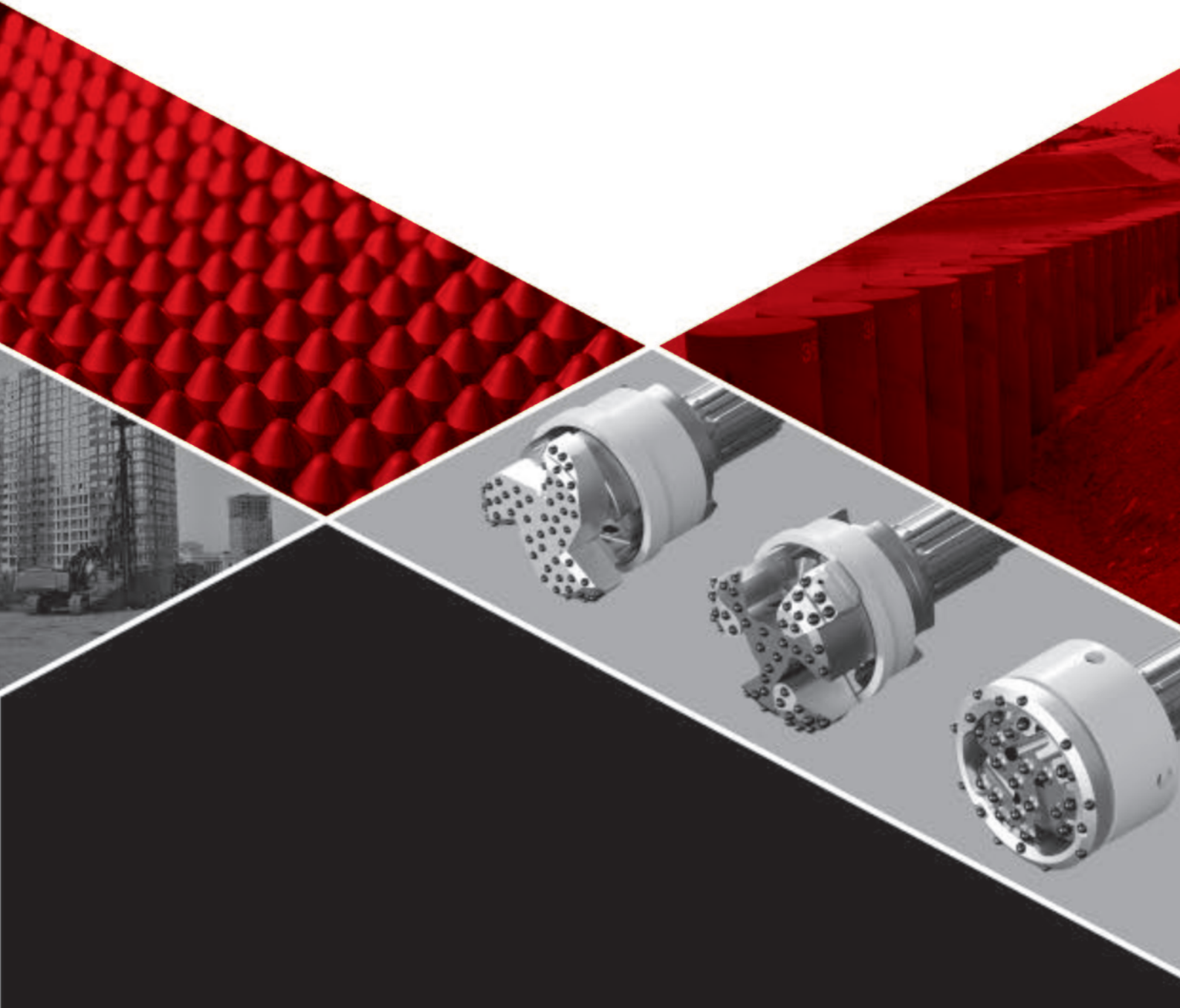


MMC RYOTEC Corporation

A Group Company of  MITSUBISHI MATERIALS

DTH HAMMER TOOLS

ADVANCED MANUFACTURING METHODS FOR CONSISTENTLY HIGHER QUALITY



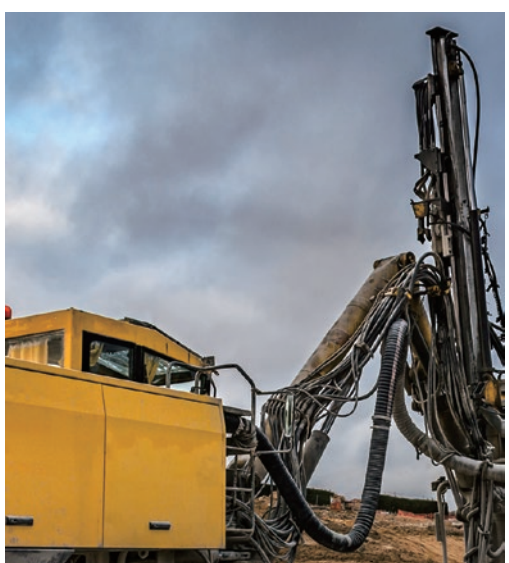


For People, Society and the Earth

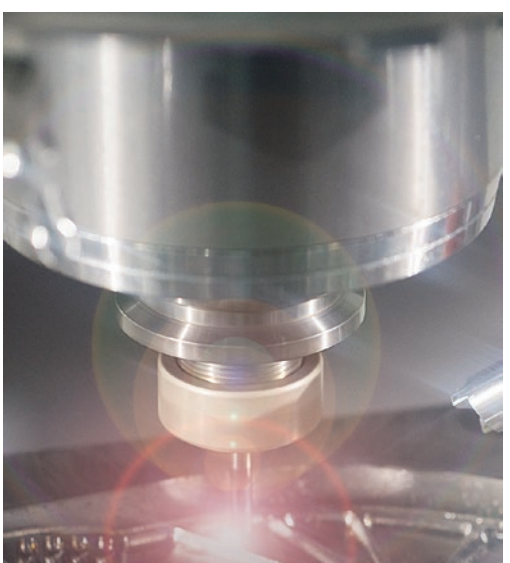
Based on the corporate philosophy of the Mitsubishi Materials Corporation Group
“For People, Society and the Earth”, MMC RYOTEC CORPORATION develops,
manufactures and markets high-quality wear resistant tools,
rock tools and carbide materials for various infrastructure industries.



WEAR RESISTANT TOOLS



ROCK TOOLS



CARBIDE MATERIALS



Brief History

- 1947** ● Mitsubishi Metal Mining Co., Ltd. (now, Mitsubishi Materials Corporation) started to manufacture rock tools.



Mitsubishi Metal Mining Co., Ltd.

- 1981** ● Gifu plant of OTE Kosan CO., Ltd.(now, MMC RYOTEC CORPORATION) was established and started to manufacture rock tools.

- 1990** ● The name of the company was changed from of OTE Kosan CO., Ltd. to OTE Technological Engineering Corporation.



OTE Technological Engineering Corporation, Gifu Plant

- 1997** ● Techno OTE Kako CO., Ltd. changed its company name to RYOTEC CO., Ltd. OTEC (THAILAND) CO., Ltd. was established to manufacture rock tools.



OTEC(THAILAND) 2005-2007



OTEC(THAILAND) 2007-

- 2000** ● Rock tools division obtained ISO14001 certification.

- 2005** ● Rock tools division obtained the ISO9001 certification.

- 2011** ● RYOTEC CO., Ltd. and MMC Hard Materials CO., Ltd. merge to form MMC RYOTEC Corporation.

- 2025** ● We will be "Mitsubishi Materials Hardmetal Corporation" on 1st of July.

Efforts for Environmental Conservation

Initiatives for MMC RYOTEC SDGs

Considering how to preserve the global environment is one of the major themes for all companies. We started to work on this problem from the early stages of our business because one of our main business is to manufacture construction tools that dig the earth.

We contribute to the global environment thru development and manufacturing.

SUSTAINABLE DEVELOPMENT GOALS



Image to aim for	Our activities	
Building a safe and clean society		·Contributing to water-well drilling.
		·Contributing to the construction of solar panels and geothermal power generation facilities.
Building a prosperous society		·Contributing to the development of industrial infrastructure.
		·Contributing to housing foundations and disaster prevention.
Building a recycling-oriented society		·Contributing to a recycling-oriented society by recycling various raw materials such as cemented carbide.
Building a low-carbon society		·Contributing to customer's operation time saving by providing efficient excavation tools.

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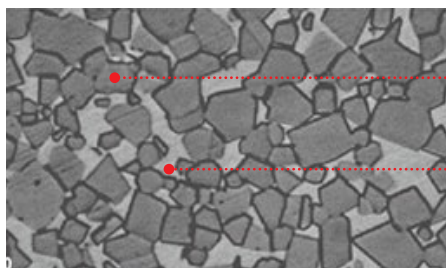
- 32...Overview of Casing Tools (SMB/NMB-G/SMB-E/UMB)
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In-house Tungsten Carbide

MMC RYOTEC Corporation share the intensive technology with Mitsubishi Materials Corporation, who has much experience, achievements and own production system from development and manufacturing of raw material powder to those of carbide materials. Our cemented carbides are applied for tools used in various industries as Cemented Carbides have a unique characteristic such as excellent wear resistance and withstanding deformation and compression.



Powder of Tungsten Carbide



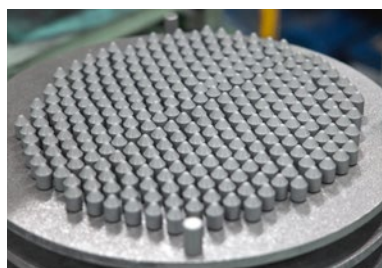
Cemented Carbide(Sintered)

Tungsten Carbide
(Dark grey)

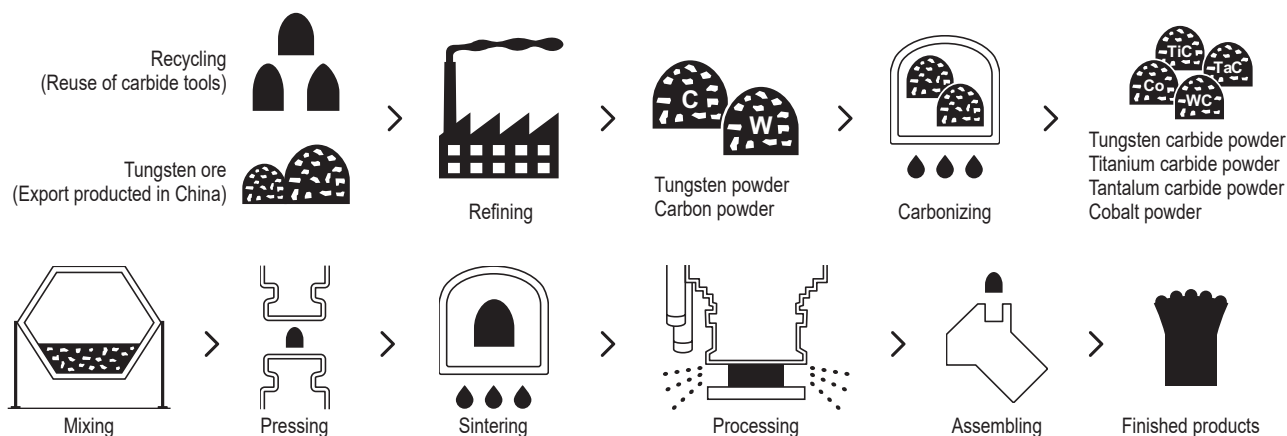
Cobalt(Grey)

In the 1940s, Mitsubishi Metal Mining Corporation developed rock tools cemented carbides for drilling in its own mines. By the 1980s, these tools with using high-wear-resistant tungsten carbides gained global recognition in both mining and construction projects.

Today, MMC RYOTEC Corporation continues to lead in rock tools supplying high-quality products to those infrastructure industries.



MMC RYOTEC carbide manufacturing system integrates development, manufacturing and recycling of materials through to the finished product.



History of Casing Tools

Our casing products have developed over 30 years by continuously responding to the desires of our customers for the kind of products they wish they had.

Launch of Super Maxbit



1993

Launch of Super Maxbit G-model



2004

Launch of New Maxbit G-model



2016

Manufacturing
of 40" SMB

2002

1990

2000

2010

2020

1998

Launch of Top Hammer Ultra Maxbit



2010

Launch of Big Bore



2025

Drill-through System
Coming soon!!



2005

Launch of DTH Ultra Maxbit



2014

Launch of Venturi



Heat Treatment Technology

With our advanced heat treatment technology and carefully selected steel materials, we deliver products that achieve the perfect balance of strength and toughness, ensuring superior performance and durability.



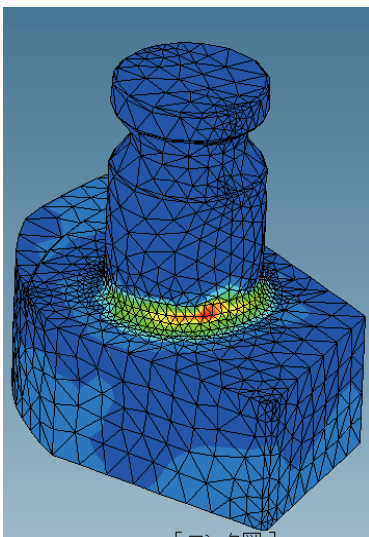
Custom Design for Specific Applications

We provide custom designs tailored to the customer's application and drilling method.

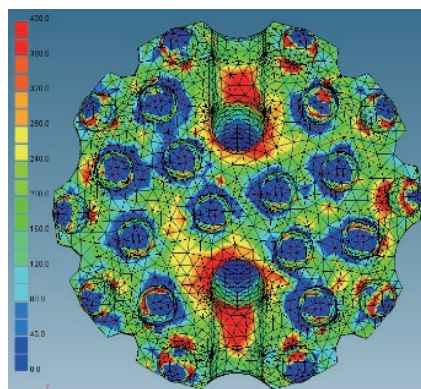


Analysis Technologies

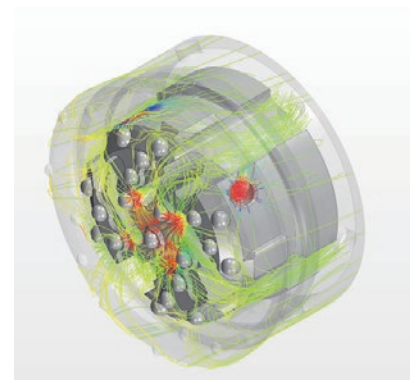
We utilize analysis techniques to carry out product design.



Stress Analysis of the bit head



Stress Analysis of DTH bits
under high-impact pressure



Fluid Analysis of the Venturi
system

Features of Our Products

Ultra MaxBit

Our Ultra Maxbit is designed with a detachable ring set and pilot bit, allowing for easy removal and re-attachment of the ring set in the hole. This design enables smooth hole cleaning without stress

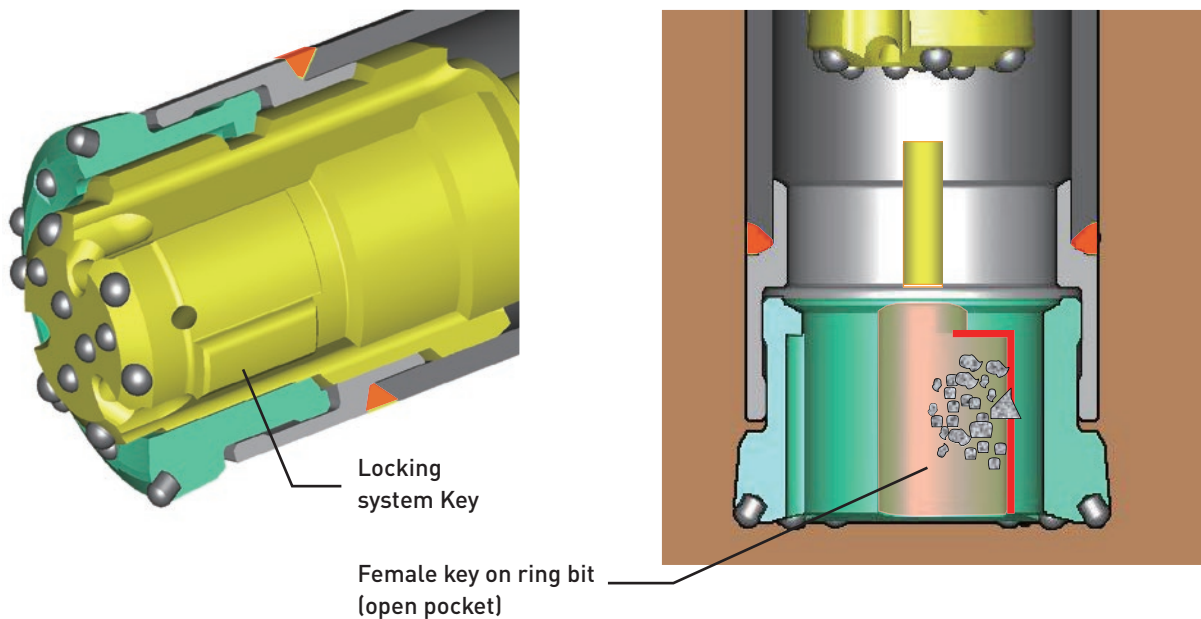
The point is 'Reverse L figure key' on ring bit.

If you want to unlock for flushing while drilling, the cuttings come into the looking key by flushing.

However, this female key cannot keep any cutting inside because of 'Reverse L figure'.

It means that there is nothing to prevent to re-lock.

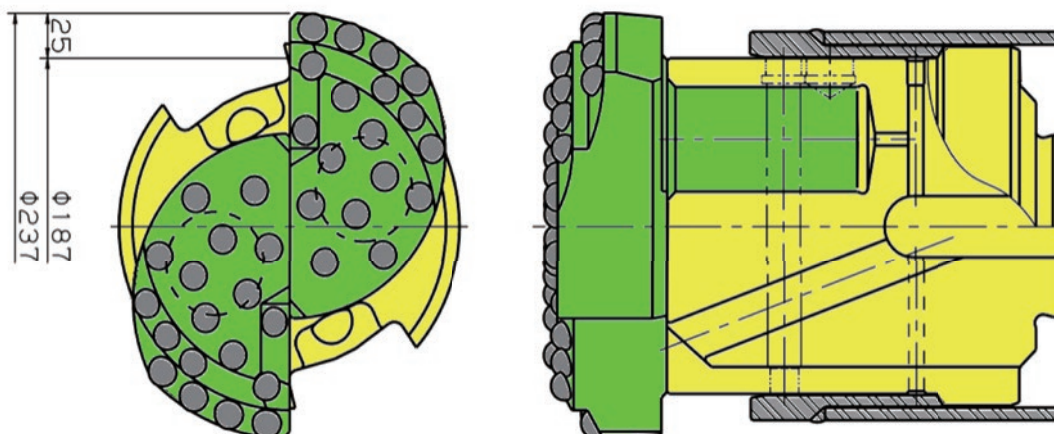
This is the reason why so easy to re-lock.



CONVENTIONAL Super MaxBit

Stable expanding and retracting mechanism

The wing bit is subject to receiving the force by the contacting friction between bit head and bottom of the hole, and is subject to receiving the opposite force from contacting with other wing bit. Therefore, it is possible to keep the wing bits expanding, even if only one wing bit got such force from the bottom.



Product Identification Code

DOWN THE HOLE BIT



DH360 P 165 R 2 5 V M

Shank model	Bit type (P: Button)	Gauge diameter (mm)	Carbide shape (R: Round, BB: Semi-ballistic, SA: Spike)	Face design (2: Flat face, 6: Concave, 8: Convex)	Carbide type (B: Heavy-duty, 5: Standard, 1: Light-duty)	Number of flushing holes (V: 2, Y: 3, X: 4)	Gauge angle

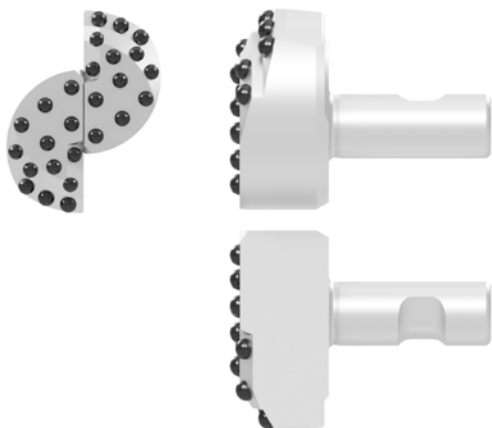
SUPER MAXBIT/NEW MAXBIT



2 QL50 P 140 R - 808

Wing bit (2: Super maxbit (Two wings model), 3: Super maxbit (Three wings model), E: Super maxbit E-model, G: Super maxbit G-model, G2: New maxbit G-model (Two wings model), G3: New maxbit G-model (Three wings model))	Hammer model, Thread shape	Bit type (P: Button)	Type	Carbide shape (R: Round, BB: Semi-ballistic, SA: Spike)	Rotation direction (-: Right rotation, L: Left rotation)	Drawing No. (Last 3-4 digits)	

WING BIT



2 HEAD P 140 R - 006

2

HEAD

P

140

R

-

006

Bit head

Bit type (**P**: Button)

Type

Carbide shape (**R**: Round, **BB**: Semi-ballistic, **SA**: Spike)

Rotation direction (**-**: Right rotation, **L**: Left rotation)

Drawing No. (Last 3-4 digits)

Wing bit (**2**: Super maxbit (Two wings model), **3**: Super maxbit (Three wings model), **E**: Super maxbit E-model, **G**: Super maxbit G-model, **G2**: New maxbit G-model (Two wings model), **G3**: New maxbit G-model (Three wings model))

RETAINER PIN SET



3 PS 242 NPR

3

PS

242

NPR

Pin Set

Type

Retainer Pin type (**CCR**: C-Clip Retainer, **SCR**: Seeger-Clip Retainer, **NPR**: New Pin Retainer, **SPR**: Spring Pin Retainer, **CSR**: Coil Spring Retainer)

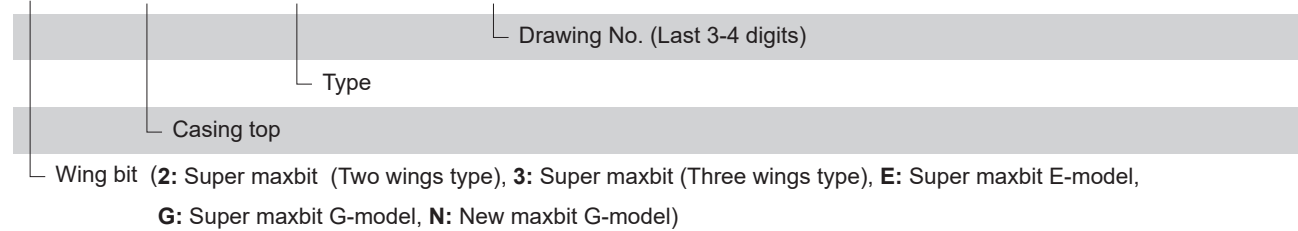
Number of pins

Product Identification Code

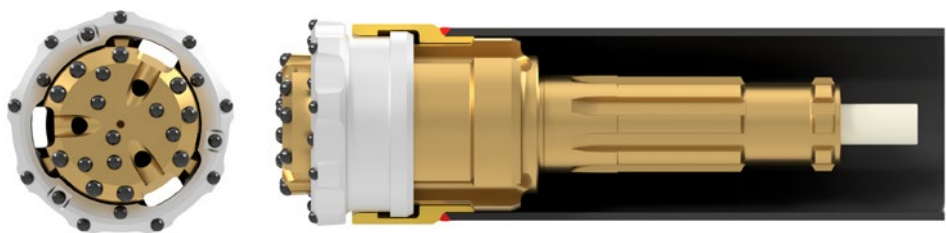
CASING TOP FOR SUPER MAXBIT/ NEW MAXBIT



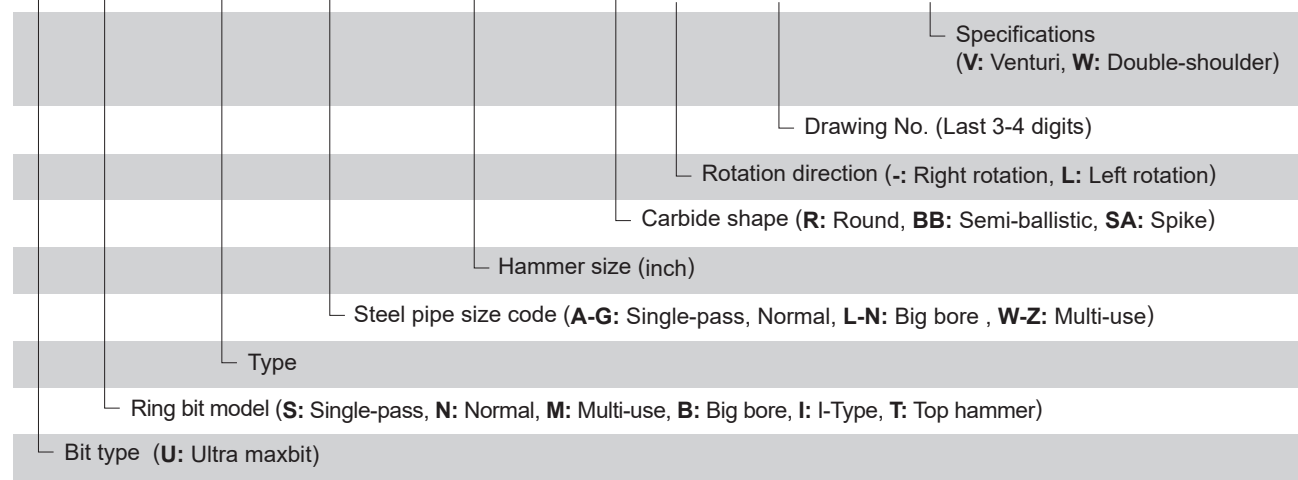
2 TOP 140 - 100



ULTRA MAXBIT



U S 110 A - 04 - R - 039



PILOT BIT



U P 110 A DH340 R 015

- Specifications
(**V**: Venturi, **W**: Double-shoulder)

Drawing No. (Last 3-4 digits)

Carbide shape (**R**: Round, **BB**: Semi-ballistic, **SA**: Spike)

Hammer model

Steel pipe size code (**A-G**: Single-pass, Normal, **L-N**: Big bore, **W-Z**: Multi-use)

Type

Pilot bit

Bit type (**U**: Ultra maxbit)

RING SET



U S 110 A - R - 0039

RS

- Ring set

Specifications
(**V**: Venturi, **W**: Double-shoulder)

Drawing No. (Last 4 digits)

Rotation direction (-: Right rotation, **L**: Left rotation)

- Carbide shape (**R**: Round, **BB**: Semi-ballistic, **SA**: Spike)

Steel pipe size code (**A-G**: Single-pass, Normal, **L-N**: Big bore, **W-Z**: Multi-use)

Type (Ring bit I.D.)

Ring bit model (**S**: Single-pass, **N**: Normal, **M**: Multi-use, **B**: Big bore, **I**: I-Type, **T**: Top hammer)

Bit type (**U**: Ultra maxbit)

Product Identification Code

HAMMER



HMDH D350

Hammer type

Hammer code

DTH Hammers and Bits



DTH Hammer Lineup



MD HAMMER Specification Charts

Size	Hammer	Bit Shank	Hole Size Range	Outside Diameter	Bore size	Overall Length	Operating length API shoulder to bit face	Piston Weight	Total Weight	Wrench Flats	Thread Connection	Minimum Air Volume Required	Maximum Operating Pressure
			inch mm	inch mm	inch mm	inch mm	inch mm	lbs kg	lbs kg	inch mm		cfm cmm	psi bar
3.5	HMDHD3.5	DHD3.5 / MDD3.5	3 1/2 to 4 1/4	3.1	2.5	40	39.6	11.7	56	2.5	2 3/8" API Pin Up	150	500
			89 to 108	78.7	63.5	1016	1016	5.31	25.4	63.5		4.5	34
4	HMDHD340	DHD340 / MDD340	4 to 5	3.63	2.95	43.6	43.7	19	86	3	2 3/8" API Pin Up	150	500
			102 to 127	92.2	75	1107	1110	8.5	38	76		4.5	34
4.5	HMDHQ45	QLX40 / MDQ45	4 1/2 to 5 1/8	4.1	3.28	40.54	40.5	22	112	3	2 3/8" API Pin Up	150	500
			114 to 130	104.14	83.3	1026	1029	10	51	76		4.5	34
5	HMDHQ50	QL50 / MDQ50	5 to 6	4.53	3.71	47.2	47.1	30	143	3.5	3 1/2" API Pin Up	250	500
			127 to 152	115	94.2	1199	1196	13.6	63	88.9		7	34
	HMDHD350	DHD350 / MDD350	5 to 6	4.53	3.71	48.2	48.1	31	143	3.5	3 1/2" API Pin Up	250	500
			127 to 152	115	94.2	1222	1222	14	63	88.9		7	34
6	HMDHQ60	QL60 / MDQ60	6 to 7	5.46	4.5	48.1	48.5	43	215	4	3 1/2" API Pin Up	450	500
			152 to 178	139	102	1222	1232	19.5	97.5	102		13	34
	HMDHD360	DHD360 / MDD360	6 to 7	5.46	4.5	52.2	52.6	43	215	4	3 1/2" API Pin Up	450	500
			152 to 178	139	102	1325	1336	20	97.5	102		13	34
	HMDHSD6	SD6 / MDSD6	6 to 8.5	5.46	4.44	53	53	45	215	4	3 1/2" API Pin Up	450	350
			152 to 215.6	139	113	1346	1346	20.4	97.5	102		13	23.8
8	HMDHQ80	QL80 / MDQ80	7 7/8 to 10	7.1	5.87	56.2	57	78	414	5.9	4 1/2" API Pin Up	900	500
			200 to 254	180	149	1427	1524	35	188	150		26	34
	HMDHD380	DHD380 / MDD380	7 7/8 to 10	7.1	5.87	56.9	57.7	78	414	5.9	4 1/2" API Pin Up	900	500
			200 to 254	180	149	1445	1542	35	188	150		26	34
	HMDHSD8	SD8 / MDSD8	7 7/8 to 10	7.1	5.87	55.8	56.6	78	414	5.9	4 1/2" API Pin Up	900	500
			200 to 254	180	149	1416	1437	35.5	188	150		26	34

* Select standard items in the table, and please inquire about special items.

DTH Hammers 3.5" - DHD3.5

Hammer Specification

	English	Metric
Outside Dia Regular Mode	3.1 in	78.7 mm
Overall Length Without Bit	40.0 in	1016 mm
Operating Length API shoulder to Bit Face	39.6 in	1006 mm
Total Weight	56 lbs	25.4 kg
Bore Size	2.5 in	63.5 mm
Piston Weight	11.7 lbs	5.31 kg
Drillpipe Connect	2-3/8 Reg API Pin Up others available upon request	
Wrench Flats	2.5 in	63.5 mm
Hole Size Range	3.5 in to 4.25 in	89 mm to 108 mm
Bit Shank Required	DHD3.5	
Minimum Air Volume Required	150 cfm	4.5 cmm
Operating Pressure	500 psi	34 bar



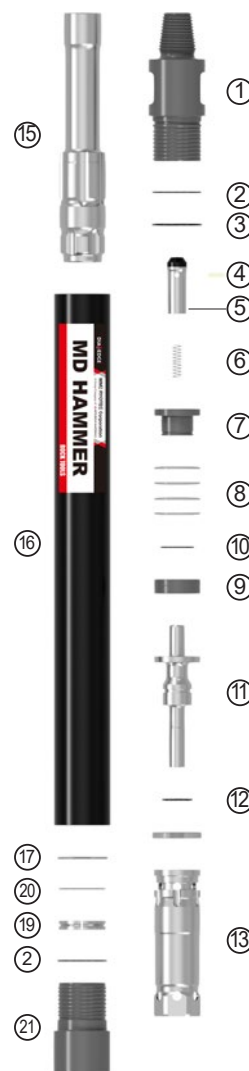
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD359-0010	1	Backhead, 2 3/8" API Reg. Pin Up	11.1	5	—	—	1
2	HP-BOW-0045	2	Breakout Washer	0.03	0	—	2	4
3	HP-ORG/BKH-0098	1	O-Ring, Back Head	0.01		1	2	4
4	HP-CST-0053	1	Set of (2) Chokes	0.01		—	—	—
5	HP-CKV-RH4-0046	1	Check Valve Assembly	0.17	0.08	—	—	1
6	HP-CVS-0052	1	Spring, Check Valve	0.03	0.01	—	1	2
7	HP-GUR-0088	1	Guide Ring, Disc Spring	0.42	0.19	—	—	—
8	HP-DSC-0082	4	Disc Spring	0.09	0.04	—	—	4
9	HP-SPT-0150	1	Spacer Ring, Disc Spring	0.01		—	1	2
10	HP-ORG/GUR-0113	1	O-Ring, Disc Spring Pack	0.5	0.23	—	—	—
11	HP-ADB-MD35-0001	1	Air Distributor	2.16	0.98	—	—	1
12	HP-ORG/ADB-0091	1	O-Ring, Air Distributor	0.01		2	4	6
13	HP-CLD-MD35-0069	1	Cylinder Assembly	3.7	1.7	—	1	2
14	HP-RRG/CLD-0134	1	Retaining Ring, Cylinder	0.11	0.1	—	—	—
15	HP-PST-MD35-0119	1	Piston	11.7	5.3	—	1	1
16	HP-WSV-MD35-0156	1	Wear Sleeve	21.9	10	1	2	3
17	HP-RRG/PST-0143	1	Retaining Ring, Piston	0.02	0.009	—	—	—
18	part not used in this hammer							
19	HP-BRR-0136	1	Retaining Ring, Bit	0.24	0.109	—	1	1
20	HP-ORG/BRR-0104	1	O-Ring, Bit Retaining Ring	0.01		1	2	4
21	HP-CHK-MD35R-0055	1	Chuck	3.9	1.8	2	4	6

THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0176		Make Up Washer					1
—	HP-RBDKIT-MD35-0183		Rebuild Kit					1
—	HP-RBDKIT-MD35H-0222		Heavy Duty Rebuild Kit					1



DTH Hammers 4" - DHD340

Hammer Specification

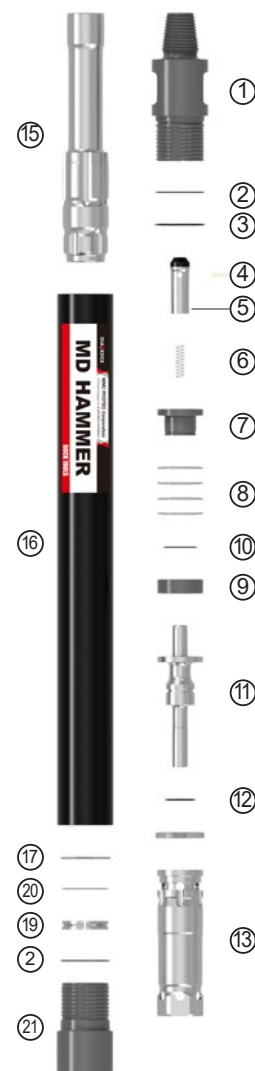
	English	Metric
Outside Dia	3.63 in	92.2 mm
Overall Length Without Bit	43.6 in	1107 mm
Operating Length API shoulder to Bit Face	43.7 in	1110 mm
Total Weight	86 lbs	38 kg
Bore Size	2.95 in	75 mm
Piston Weight	19 lbs	8.5 kg
Drillpipe Connect	2-3/8 Reg API Pin Up others available upon request	
Wrench Flats	3 in	76 mm
Hole Size Range	4 in to 5 in	102 mm to 127 mm
Bit Shank Required	DHD340	
Minimum Air Volume Required	150 cfm	4.5 cmm
Operating Pressure	500 psi	34 bar



Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND			
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3	
1	HP-BKH-MD409-0011	1	Back Head, 2 3/8" API Reg. Pin Up	16.8	7.6	—	—	1	
2	HP-BOW-0038	2	Breakout Washer	0.03	0	—	2	4	
3	HP-ORG/BKH-0099	1	O-Ring For Back Head	0.01		1	2	4	
4	HP-CST-0053	1	Set of (2) Chokes	0.01		—	—	—	
5	HP-CKV-RH4-0046	1	Check Valve Assembly	0.1	0.05	—	—	1	
6	HP-CVS-0052	1	Check Valve Spring	0.01	0	—	1	2	
7	HP-GUR-0089	1	Guide Ring, Disc Spring	0.9	0.41	—	—	—	
8	HP-DSC-0083	4	Disc Spring	0.13	0.06	—	—	4	
9	HP-SPT-0151	1	Spacer Ring, Disc Spring	0.9	0.41	—	—	—	
10	HP-ORG/GUR-0114	1	O-Ring For Guide Ring	0.01		—	1	2	
11	HP-ADB-MD340-0002	1	Air Distributor	3.3	1.5	—	—	1	
12	HP-ORG/ADB-0092	1	O-Ring For Air Distributor	0.01		2	4	6	
13	HP-CLD-MD40B-0070	1	Cylinder Body	5.1	2.3	—	1	2	
14	HP-RRG/CLD-0137	1	Retaining Ring, Cylinder	0.3	0.1	—	—	—	
15	HP-PST-MD40R-0120	1	Piston	18.7	8.5	—	1	1	
16	HP-WSV-MD40-0157	1	Wear Sleeve	31.8	14.5	1	2	3	
17	HP-RRG/PST-0144	1	Retaining Ring, Piston	0.07	0.032	—	—	—	
18	part not used in this hammer								
19	HP-BRR-0030	1	Retaining Ring, Bit	0.5	0.227	—	1	1	
20	HP-ORG/BRR-0105	1	O-Ring For Bit Retaining Ring	0.01		1	2	4	
21	HP-CHK-MD40R-0056	1	Chuck	6.7	3	2	4	6	
THE FOLLOWING PARTS ARE SOLD SEPARATE									
—	HP-MUW-0177		Make Up Washer					1	
—	HP-RBDKIT-MD40-0184		Rebuild Kit					1	



DTH Hammers 4.5" - QLX40

Hammer Specification

	English	Metric
Outside Dia	4.1 in	104 mm
Overall Length Without Bit HMDHQ45 models	40.4 in	1026 mm
Operating Length API shoulder to Bit Face HMDHQ45 models	40.5 in	1029 mm
Total Weight	112 lbs	51 kg
Bore Size	3.3 in	83.8 mm
Piston Weight	22 lbs	10 kg
Drillpipe Connect	2-3/8 Reg API Pin Up others available upon request	
Wrench Flats	3 in	76 mm
Hole Size Range	4-1/2 in to 5-1/8 in 114 mm to 130 mm	
Bit Shank Required HMDHQ45 models	QLX40	
Minimum Air Volume Required	150 cfm	4.5 cmm
Maximum Operating Pressure	500 psi	34 bar



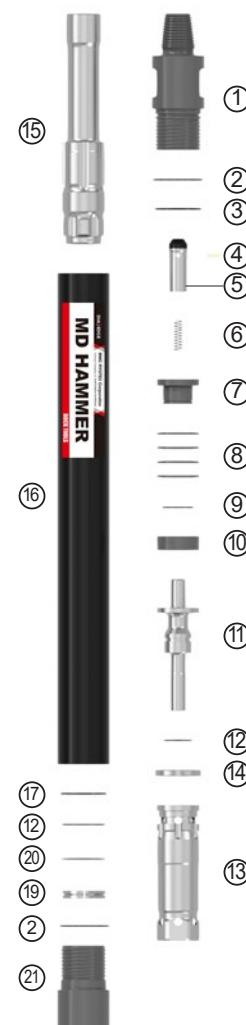
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand. Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD459-0012	1	Back Head, 2 3/8" API Reg. Pin-Up	21	9.5	—	—	1
2	HP-BOW-0044	2	Washer, Breakout	0.03	0	—	2	4
3	HP-ORG/BKH-0100	1	O-Ring, Backhead	0.01		1	2	4
4	HP-CST-0053	1	Choke Set	0.01		—	—	—
5	HP-CKV-RH45-0047	1	Check Valve Body	0.58	0.26	—	—	1
6	HP-CVS-0052	1	Spring, Check Valve	0.3	0.14	—	1	2
7	HP-GUR-0086	1	Guide Ring	0.9	0.41	—	—	—
8	HP-DSC-0081	4	Disc Spring	0.25	0.11	—	—	4
9	HP-ORG/GUR-0115	1	O-Ring, Guide Ring	0.01		—	1	2
10	HP-SPT-0148	1	Spacer Ring	1.4	0.64	—	—	—
11	HP-ADB-MD45-0003	1	Air Distributor	4.5	2.05	—	—	1
12	HP-ORG/ADB-0093	1	O-Ring, Air Distributor	0.01		2	4	6
13	HP-CLD-MD45-0071	1	Cylinder Assy (including Cyl Ret Ring)	7	3.2	—	1	2
13	HP-CLDB-MD45-0169	1	Cylinder Body	—	—	—	—	—
14	HP-RRG/CLD-0208	1	Retaining Ring, Cylinder	0.45	0.2	—	—	—
15	HP-PST-MD45-0121	1	Piston	30	13.6	—	1	1
16	HP-WSV-MD45-0158	1	Wear Sleeve	39	17.7	1	2	3
17	HP-RRG/PST-0141	1	Retaining Ring, Piston	0.14	0.064	—	—	—
18	part not used in this hammer							
19	HP-BRR-0210	1	Retaining Ring, Bit Q40	0.65	0.295	—	1	1
20	HP-ORG/BRR-0106	1	O-Ring, Bit Retaining Ring	0.01		1	2	4
21	HP-CHK-MD45Q-0057	1	Chuck, Q40	11	5	2	4	6

THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0205		Washer, Make-up					1
—	HP-RBDKIT-MD45Q-0186		Rebuild Kit Q40					



DTH Hammers 5" - QL50/DHD350

Hammer Specification

	English	Metric
Outside Dia	4.53 in	115 mm
Overall Length Without Bit		
HMDHQ50	47.2 in	1199 mm
HMDHD350	48.2 in	1222 mm
Operating Length API shoulder to Bit Face		
HMDHQ50	47.1 in	1196 mm
HMDHD350	48.1 in	1222 mm
Total Weight	139 lbs	63 kg
Bore Size	3.71 in	94.2 mm
Piston Weight	30 lbs	13.6 kg
Drillpipe Connect	3-1/2 Reg API Pin Up others available upon request	
Wrench Flats	3.5 in	88.9 mm
Hole Size Range	5 in to 6 in	127 mm to 152 mm
Bit Shank Required	QL50 DHD350	
HMDHQ50		
HMDHD350		
Minimum Air Volume Required	250 cfm	7 cmm
Maximum Operating Pressure	500 psi	34 bar



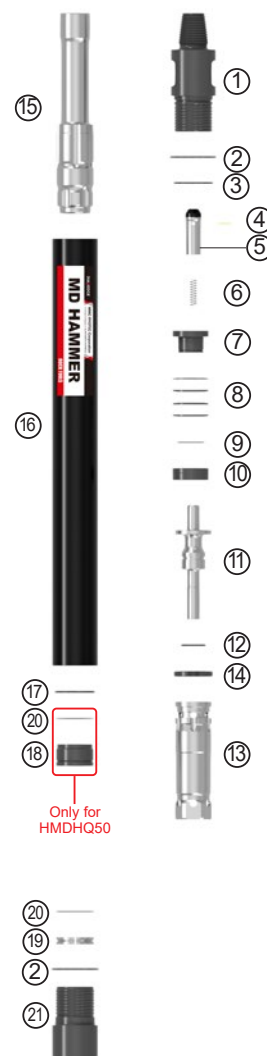
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD5Q1-0014	1	Back Head, 3 1/2" API Reg. Pin-Up	30.5	13.9	—	—	1
2	HP-BOW-0039	2	Breakout Washers	0.03	0	—	2	4
3	HP-ORG/BKH-0101	1	O-Ring, Back Head	0.01		1	2	4
4	HP-CST-0054	1	Choke Set	0.01		—	—	—
5	HP-CKV-RH6-0048	1	Check Valve Assy.	0.58	0.26	—	—	1
6	HP-CVS-0050	1	Spring Check Valve	0.3	0.14	—	1	2
7	HP-GUR-0085	1	Guide Ring	0.9	0.41	—	—	—
8	HP-DSC-0080	4	Disc Spring	0.25	0.11	—	—	4
9	HP-ORG/GUR-0116	1	O-Ring, Guide Ring	0.01		—	1	2
10	HP-SPT-0147	1	Spacer Ring	1.4	0.64	—	—	—
11	HP-ADB-MD50-0004	1	Air Distributor	4.5	2.05	—	—	1
12	HP-ORG/ADB-0094	1	O-Ring, Air Distributor & Bearing	0.01		1	2	4
13	HP-CLD-MD50-0072	1	Cylinder Assy. (Includes Cyl Ret Ring)	7	3.2	—	1	2
14		1	RETAINING RING, COMES ON CYLINDER 13	0.45	0.2	—	—	—
15	HP-PST-MD50-0123	1	Piston for HMDHQ50	30	13.6	—	1	1
15	HP-PST-MD50R-0124	1	Piston for HMDHD350	30	13.6	—	1	1
16	HP-WSV-MD50-0159	1	Wear Sleeve	50	22.7	1	2	3
17	HP-RRG/PST-0145	1	Bearing, Piston Retaining Ring	0.14	0.064	—	—	—
18	HP-BRG-MD50-0026	1	Bearing for HMDHQ50	1	0.455	—	1	1
18	part not used in HMDHD350							
19	HP-BRR-0032	1	Bit Retaining Ring	0.65	0.295	—	1	1
20	HP-BRG-0025	1 or 2	"O-Ring, Bit Retaining Ring 2 for HMDHQ50, 1 for HMDH350"	0.01		1 or 2	2 or 4	3 or 6
21	HP-CHK-MD5Q-0060	1	Chuck for HMDHQ50	7.9	3.6	2	4	6
21	HP-CHK-MD50R-0212	1	Chuck for HMDHD350	11	5	2	4	6

THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0178		Make-Up Washer					1
—	HP-RBDKIT-MD50Q-0187		Rebuild Kit for HMDHQ50					1
—	HP-RBDKIT-MD50-0188		Rebuild Kit for HMDHD350					1



DTH Hammers 6" - QL60

Hammer Specification

	English	Metric
Outside Dia	5.46 in	139 mm
Overall Length Without Bit	48.1 in	1222 mm
Operating Length API shoulder to Bit Face	48.5 in	1232 mm
Total Weight	215 lbs	97.5 kg
Bore Size	4.5 in	114 mm
Piston Weight	43 lbs	19.5 kg
Drillpipe Connect	3-1/2 Reg API Pin Up others available upon request	
Wrench Flats	4 in	101.6 mm
Hole Size Range	6 in to 7 in 152 mm to 178 mm	
Bit Shank Required	QL60	
Minimum Air Volume Required	450 cfm	13 cmm
Operating Pressure	500 psi	34 bar



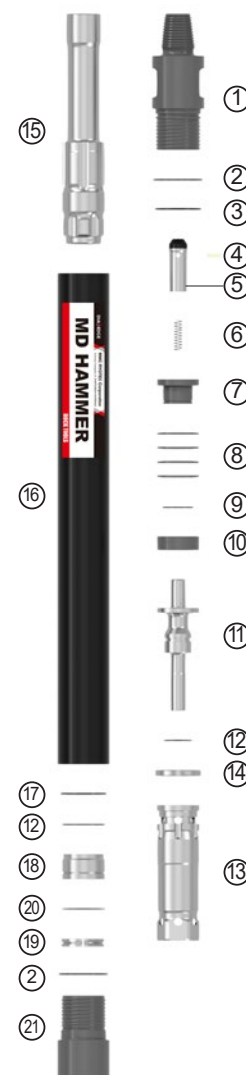
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand. Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD6Q1-0018	1	Back Head, 3 1/2" API Reg. Pin Up	46.5	21.14	—	—	1
2	HP-BOW-0040	2	Break Out Washer	0.03	—	—	2	4
3	HP-ORG/BKH-0102	1	O-Ring for Backhead	0.01	—	1	2	4
4	HP-CST-0054	1	Choke Set	0.01	—	—	—	—
5	HP-CKV-RH6-0048	1	RH6 Check Valve Assembly	0.58	0.26	—	—	1
6	HP-CVS-0050	1	Spring for Check Valve	0.3	0.14	—	1	2
7	HP-GUR-0084	1	Disc Spring Guide Ring	1.65	0.75	—	—	—
8	HP-DSC-0078	4	Disc Spring	0.25	0.11	—	—	4
9	HP-ORG/GUR-0117	1	O-Ring for Guide Ring	0.01	—	—	1	2
10	HP-SPT-0153	1	Disc Spring Spacer Tube	1.64	0.75	—	—	—
11	HP-ADB-MD61-0007	1	Air Distributor	10.5	4.77	—	—	1
12	HP-ORG/ADB-0096	2	O-Ring for Air Distributor & Bearing	0.01	—	2	4	6
13	HP-CLD-MD61-0074	1	Cylinder Assembly	6.7	3.05	—	1	2
13	HP-CLDB-MD61-0173	1	Cylinder Body	6.7	3.05	—	1	2
14	HP-RRG/CLD-0203	1	Retaining Ring for Cylinder	0.48	0.22	—	—	—
15	HP-PST-MD6Q2-0127	1	Piston	47.3	21.5	—	1	1
16	HP-WSV-MD61-0161	1	Wear Sleeve	83.4	37.91	1	2	3
17	HP-RRG/BRG-0135	1	Retaining Ring for Bearing	0.16	0.07	—	—	—
18	HP-BRG-MD6QH-0023	1	Bearing	3.7	1.68	—	1	1
19	HP-BRR-0031	1	Bit Retaining Ring	1.49	0.68	—	1	1
20	HP-ORG/BRR-0108	1	O-Ring for Bit Retaining Ring	0.01	—	1	2	4
21	HP-CHK-MD6Q-0064	1	Chuck	14.7	6.68	2	4	6

THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0181		Make Up Washer	—	—	—	—	1
—	HP-RBDKIT-MD61Q-0194		Rebuild Kit	—	—	—	—	—
—	HP-RBDKIT-MD61QHD-0216		Heavy Duty Rebuild Kit	—	—	—	—	—



DTH Hammers 6" - DHD360

Hammer Specification

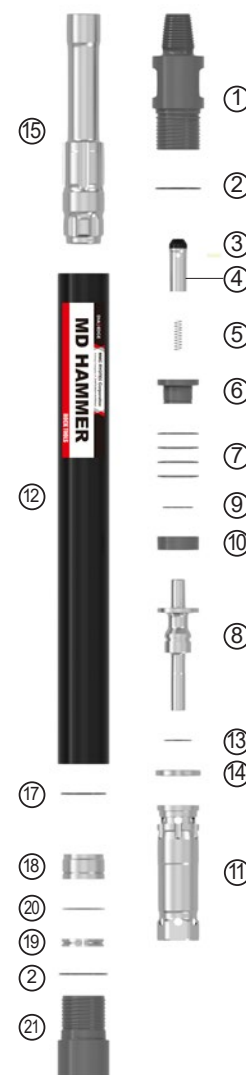
	English	Metric
Outside Dia	5.46 in	139 mm
Overall Length Without Bit	53.0 in	1346 mm
Total Weight	215 lbs	97.5 kg
Bore Size	4.44 in	113 mm
Piston Weight	45 lbs	20.4 kg
Drillpipe Connect	3-1/2 Reg API Pin Up others available upon request	
Wrench Flats	4 in	102 mm
Hole Size Range	6 in to 8-1/2 in	
Bit Shank Required	DHD360	
Minimum Air Volume Required	450 cfm	13 cmm
Maximum Operating Pressure	350 psi	23.8 bar



Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD61-0223	1	Back Head, 3 1/2" API Reg. Pin Up	41.5	18.8	—	—	1
2	HP-ORG/BKH-0102	1	O-Ring for Backhead			1	2	4
3	HP-CST-0054	1	Choke Set			—	—	1
4	HP-CKV-RH6-0048	1	Check Valve Assembly	0.8	0.36	—	—	1
5	HP-CVS-0050	1	Check Valve Spring	0.05	0.02	—	1	2
6	HP-WSR-0155	1	Washer	0.36		—	—	1
7	HP-DSC-0078	4	Disc Spring	0.68	0.31	—	4	8
8	HP-ADB-MD60-0006	1	Air Distributor	15	6.8	—	—	1
9	HP-ORG/ADB-0090	1	O-Ring for Air Distributor	0.01	0	—	1	2
10	HP-PRR-0133	1	Retaining Ring for Cylinder & Piston	0.56	0.25	—	—	2
11	HP-CLD-MD6S-0076	1	Cylinder	12.3	5.58	—	—	1
12	HP-WSV-MD6S-0225	2	Wear Sleeve	90	40.8	1	2	3
13	HP-ORG/BRR-0108	1	O-Ring for Bit Retaining Ring	0.01		—	1	2
14	HP-BOW-0040	1	Breakout Washer	0.03	0.014	1	2	4
15	HP-PST-MD6S-0128	1	Piston	45	20.4	—	—	1
16	HP-BRG-MD6S-0024	1	Bearing	4.5	2.04	—	—	1
17	HP-DSC-0078	4	Disc Spring	0.68	0.31	—	4	8
18	HP-WSR-0155	1	Washer	0.36		—	—	1
19	HP-SNR-0146	1	Snap Ring	0.32		—	—	1
20	HP-BRR-0029	1	Bit Retaining Ring	1.65	0.75	—	—	1
21	HP-CHK-MD6-0224	1	Chuck	14	6.3	2	4	6
THE FOLLOWING PARTS ARE SOLD SEPARATE								
25	HP-MUW-0181		Make Up Washer					1
—	HP-RBDKIT-MD6S-0226		Rebuild Kit					1
—	HP-RBDKIT-MD6SHD-0193		Heavy Duty Rebuild Kit					1



DTH Hammers 6" - SD6

Hammer Specification

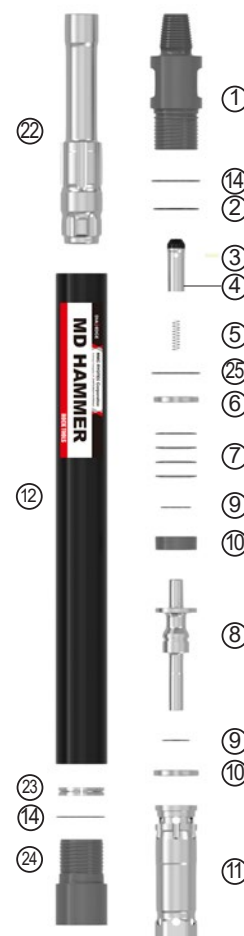
	English	Metric
Outside Dia	5.46 in	139 mm
Overall Length Without Bit	53.6 in	1361 mm
Total Weight	215 lbs	97.5 kg
Bore Size	4.44 in	113 mm
Piston Weight	45 lbs	20.4 kg
Drillpipe Connect	3-1/2 Reg API Pin Up others available upon request	
Wrench Flats	4 in	102 mm
Hole Size Range	6 in to 8-1/2 in	
Bit Shank Required	SD6	
Minimum Air Volume Required	450 cfm	13 cmm
Maximum Operating Pressure	350 psi	23.8 bar



Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
THE FOLLOWING PARTS ARE IN 8 INCH MODEL HAMMERS								
1	HP-BKH-MD61-0366	1	BACKHEAD WITH 3-1/2 REG API PIN UP	41.5	18.8	—	—	1
2	HP-ORG/BKH-0370	1	O-RING, BACKHEAD			1	2	4
3	HP-CST-0371	1	CHOKE SET			—	—	1
4	HP-CKV-MD6-0372	1	CHECK VALVE	0.8	0.36	—	—	1
5	HP-CVS-0373	1	SPRING, CHK VAL	0.05	0.02	—	1	2
6	HP-WSR-0374	1	WASHER	0.36		—	—	1
7	HP-DSC-0375	4	DISK SPRINGS	0.68	0.31	—	4	8
8	HP-ADB-MD6-0376	1	AIR DISTRIBUTOR	15	6.80	—	—	1
9	HP-ORG/ADB-0377	1	O-RING, AIR DISTRIBUTOR	0.01	0.00	—	1	2
10	HP-RRG/CLD-0378	1	RET RING, CYLINDER/PISTON	0.56	0.25	—	—	2
11	HP-CLD-MD6S-0379	1	CYLINDER	12.3	5.58	—	—	1
12	HP-WSV-MD6S-0380	1	WEAR SLEEVE	90	40.8	1	2	3
13	HP-ORG/BRR-0382	1	O-RING, BIT RET. RING	0.01		—	1	2
14	HP-BOW-0383	2	BREAKOUT WASHER	0.03	0.014	1	2	4
HMDHSD6 PARTS ONLY								
22	HP-PST-MD6SM-0384	1	PISTON	45	20.4	—	—	1
23	HP-BRR-0386	1	BIT RETAINING RING	0.9	0.41	—	—	1
24	HP-CHK-MD6M-0387	1	CHUCK	14	6.3	2	4	6
THE FOLLOWING PARTS ARE SOLD SEPARATE								
25	HP-MUW-0389		MAKE-UP WASHER	0.12	0.05	—	1	2
—	HP-CRRIKIT-0390		CYL RET RING INSTALL KIT					
—	HP-CYLIKIT-0391		CYLINDER ISTALL KIT					
—	HP-CYLIKIT-MD6SM-0392		SET OF CYLINDER INSTALL RINGS AVAILABLE AT NO CHARGE					



DTH Hammers 8" - QL80/DHD380

Hammer Specification

	English	Metric
Outside Dia	7.10 in	180 mm
Overall Length Without Bit		
HMDHD380 Models	56.9 in	1445 mm
HMDHQ80 Models	56.2 in	1427 mm
Operating Length API Shoulder to Bit Face		
HMDHD380 Models	57.7 in	1542 mm
HMDHQ80 Models	57.0 in	1524 mm
Total Weight	414 lbs	188 kg
Bore Size	5.87 in	149 mm
Piston Weight	78 lbs	35 kg
Drillpipe Connect	4-1/2 Reg API Pin Up others available upon request	
Wrench Flats	5.9 in	150 mm
Hole Size Range All Models	7-7/8 in to 10 in	200 mm to 254 mm
Bit Shank Required		
HMDHD380 Models	DHD380	
HMDHQ80 Models	QL80	
Minimum Air Volume Required	900 cfm	26 cmm
Maximum Operating Pressure All Models	500 psi	34 bar



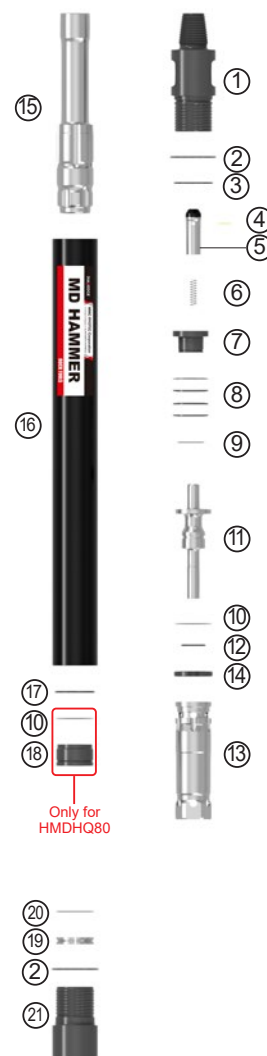
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand.
Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD803-0020	1	Back Head, 4 1/2" API Reg. Pin Up	98	44.5	—	—	1
2	HP-BOW-0041	2	Washer, Breakout	0.03	0	—	2	4
3	HP-ORG/BKH-0103	1	O-Ring for Back Head	0.01		1	2	4
4	HP-CST-0054	1	Choke Set	0.01		—	—	—
5	HP-CKV-RH8-0049	1	Check Valve Body	1.2	0.55	—	—	1
6	HP-CVS-0051	1	Spring, Check Valve	0.3	0.14	—	1	2
7	HP-GUR-0087	1	Disc Spring Guide Ring	4.3	1.95	—	—	—
8	HP-DSC-0079	4	Disc Spring	0.22	0.1	—	—	4
9	HP-SPT-0149	1	Spacer Ring	4.4	2	—	—	—
10	HP-ORG/GUR-0118	3 or 2	O-Ring for Guide Ring, Bearing & Air Dist 3 for HMDHQ80, 2 for HMDHD380	0.01		3 or 2	6 or 4	9 or 6
11	HP-ADB-MD80-0009	1	Air Distributor	4.5	2.05	—	—	1
12	part not used in this hammer							
13	HP-CLD-MD80-0077	1	Cylinder, Assembly	7	3.2	—	1	2
14		1	RETAINING RING, COMES ON CYLINDER 13	0.45	0.2	—	—	—
15	HP-PST/LOW-MD80Q1-0129	1	Piston for HMDHQ80	78	35.5	—	1	1
15	HP-PST/LOW-MD80R1-0130	1	Piston for HMDHD380	78	35.5	—	1	1
16	HP-WSV-MD80-0166	1	Wear Sleeve	139	63.2	1	2	3
17	HP-RRG/PST-0142	1	Retaining Ring, Piston	0.24	0.109	—	—	—
18	HP-BRG-MD80-0028	1	Bearing	6.7	3.045	—	1	1
18	part not used in HMDHD380							
19	HP-BRR-0036	1	Bit Retaining Ring	3.2	1.455	—	1	1
20	HP-ORG/BRR-0111	1	O-Ring for Bit Retaining Ring	0.01		2	4	6
21	HP-CHK-MD80Q-0067	1	Chuck for HMDHQ80	25.8	11.7	2	4	6
21	HP-CHK-MD80R-0068	1	Chuck for HMDHD380	25.8	11.7	2	4	6

THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0206		Washer, Make-Up					1
—	HP-RBDKIT-MD80QLV-0197		Rebuild Kit for HMDHQ80					1
—	HP-RBDKIT-MD80LV-0199		Rebuild Kit for HMDHD380					1



DTH Hammers 8" - SD8

Hammer Specification

	English	Metric
Outside Dia	7.10 in	180 mm
Overall Length Without Bit	55.8 in	1416 mm
Operating Length API shoulder to Bit Face	56.6 in	1437 mm
Total Weight	414 lbs	188 kg
Bore Size	5.87 in	149 mm
Piston Weight	78 lbs	35 kg
Drillpipe Connect	4-1/2 Reg API Pin Up others available upon request	
Wrench Flats	5.9 in	150 mm
Hole Size Range	7.8 to 10 in 200 mm to 254 mm	
Bit Shank Required	SD8	
Minimum Air Volume Required	900 cfm	26 cmm
Operating Pressure	500 psi	34 bar



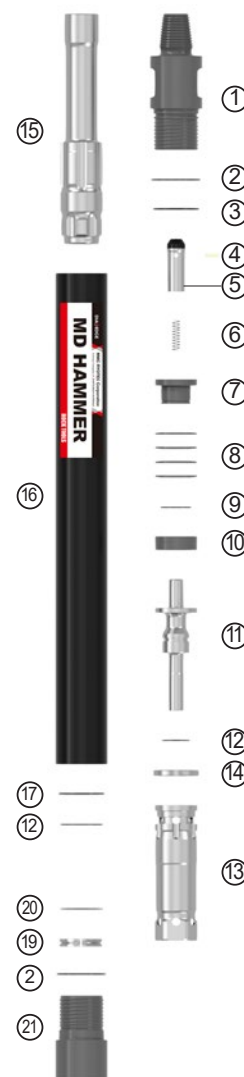
Parts List

Shown at the right side of the chart is the quantity of spare parts that should be kept on hand. Level 1 is for water well drilling, Level 3 is for high production drilling.

ITEM No	PART No	QTY REQD	PART NAME	WEIGHT		SPARE PARTS ON HAND		
				LBS	KGS	LEVEL 1	LEVEL 2	LEVEL 3
1	HP-BKH-MD803-0393	1	BACKHEAD	98	44.5	—	—	1
2	HP-BOW-0394	2	WASHER, BREAKOUT	0.03	0.0	—	2	4
3	HP-ORG/BKH-0395	1	O-RING, BACKHEAD	0.01		1	2	4
4	HP-CST-0396	1	CHOKE SET, SET OF 3	0.01		—	—	—
5	HP-CKV-MD8-0397	1	CHECK VALVE, WITH SEAL CAP	1.2	0.55	—	—	1
6	HP-CVS-0398	1	SPRING, CHK VAL	0.30	0.14	—	1	2
7	HP-GUR-0399	1	GUIDE RING	4.30	1.95	—	—	—
8	HP-DSC-0400	4	DISC SPRING	0.22	0.10	—	—	4
9	HP-ORG/GUR-0401	2	O-RING, GUIDE RING, AIR DIST	0.01		2	4	6
10	HP-SPT-0344	1	SPACER RING	4.40	2.00	—	—	—
11	HP-ADB-MD80-0403	1	AIR DISTRIBUTOR	22	10.00	—	—	1
12			part not used in this hammer					
13	HP-CYL-MD80-0404	1	CYLINDER, COMES WITH RING 14 INSTALLED	7.0	3.2	—	1	2
14		1	RETAINING RING, COMES ON CYLINDER 13	2.7	1.2	—	—	—
15	HP-PST-MD80M2-0405	1	PISTON, FOR 6315/SD8 BIT FOR STANDARD MODEL	78.0	35.5	—	1	1
16	HP-WSV-MD80-0407	1	WEAR SLEEVE	139	63.2	1	2	3
17	HP-RRG/PST-0408	1	RETAINING RING, PISTON	0.24	0.109	—	—	—
18			part not used in this hammer					
19	HP-BRR-0409	1	RETAINING RING, 6315/SD8 BIT	3.2	1.455	—	1	1
20	HP-ORG/BRR-0410	1	O-RING, BIT RETAINING RING	0.01		2	4	6
21	HP-CHK-MD80M-0411	1	CHUCK, 6315/SD8 BIT	25.8	11.7	2	4	6

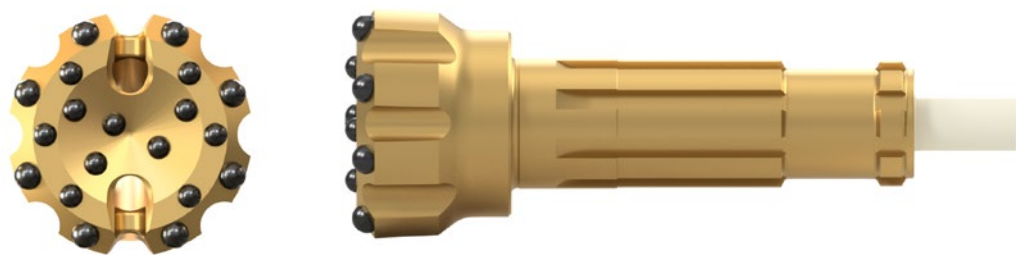
THE FOLLOWING PARTS ARE SOLD SEPARATE

—	HP-MUW-0413		MAKEUP WASHER	—	—	—	—	1
—	HP-CLDIKIT-MD80M-0414		SET OF CYLINDER INSTALL RINGS, AVAILABLE AT NO CHARGE	—	—	—	—	—



DTH Product Lineup

DTH Bits

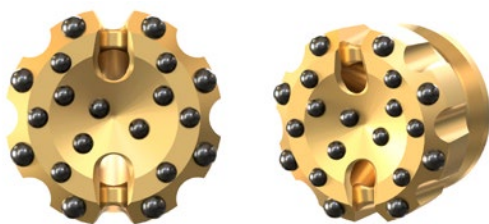


Face Designs of DTH Bits

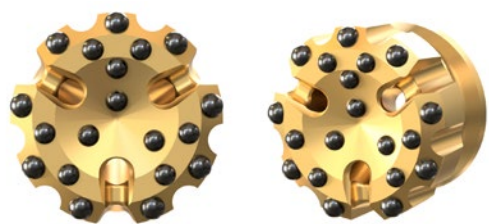
CONCAVE / TYPE 65

CONCAVE is the most common face style. Its dish-shaped face ensures excellent penetration in medium to hard rock while maintaining a straight hole. It also provides superior air flushing, making it ideal for most drilling conditions.

2 flushing holes design



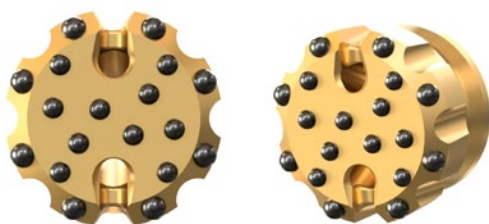
3 flushing holes design



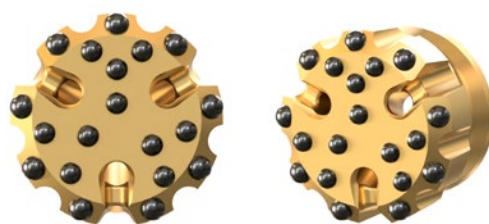
FLAT FACE / TYPE 25

FLAT FACE is ideal for hard rock and broken formations, offering aggressive drilling performance. It is mainly used for blast hole drilling and lead off in deep holes. Standard face slots help keep the cutting face clean.

2 flushing holes design



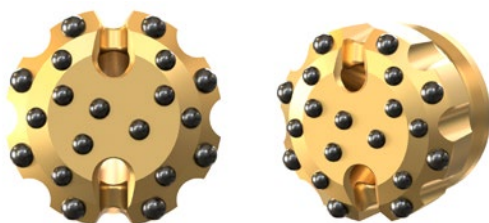
3 flushing holes design



CONVEX / TYPE 85

CONVEX is designed for high-speed drilling, ideal for soft to medium-hard, non-abrasive rock formations.

2 flushing holes design



3 flushing holes design



For 3.5" Hammers

Face design	Shank	Gauge Diameter		Product code	Gauge Button	Face Button	Flushing holes
		mm	Inch		No x Dia(mm)	No x Dia(mm)	
Flat face 	DHD3.5	90	3 1/2	DH3.5P90R25VM	8 x φ12	6 x φ12	2
		95	3 3/4	DH3.5P95R25VM	8 x φ12	6 x φ12	2
		100	3 15/16	DH3.5P100R25VM	8 x φ13	6 x φ13	2
		105	4 1/8	DH3.5P105R25VM	8 x φ14	6 x φ14	2
		Foot Valve		FV-DH3.5			
Flat face 	MIS30	90	3 1/2	MIS30P90R25VM	8 x φ12	6 x φ12	2
		95	3 3/4	MIS30P95R25VM	8 x φ12	6 x φ12	2
		100	3 15/16	MIS30P100R25VM	8 x φ13	6 x φ13	2
		105	4 1/8	MIS30P105R25VM	8 x φ14	6 x φ14	2
		Foot Valve		FV-MIS30			
Flat face 	COP32	90	3 1/2	COP32P90R25VM	8 x φ12	6 x φ12	2
		95	3 3/4	COP32P95R25VM	8 x φ12	6 x φ12	2
		100	3 15/16	COP32P100R25VM	8 x φ13	6 x φ13	2
		105	4 1/8	COP32P105R25VM	8 x φ14	6 x φ14	2
		Foot Valve		FV-COP32			

For 4" Hammers

Face design	Shank	Gauge Diameter		Product code	Gauge Button	Face Button	Flushing holes
		mm	Inch		No x Dia(mm)	No x Dia(mm)	
Flat face 	DHD340	110	4 3/8	DH340P110R25VM	8 x φ14	7 x φ14	2
		115	4 1/2	DH340P115R25VM	8 x φ14	7 x φ14	2
		120	4 5/7	DH340P120R25VM	8 x φ14	7 x φ14	2
		127	5	DH340P127R25VM	8 x φ16	8 x φ14	2
		Foot Valve		FV-DH340			
Concave 	DHD340	110	4 3/8	DH340P110R65VM	8 x φ14	6 x φ14	2
		115	4 1/2	DH340P115R65VM	8 x φ14	7 x φ14	2
		120	4 5/7	DH340P120R65VM	8 x φ14	7 x φ14	2
		127	5	DH340P127R65VM	8 x φ16	8 x φ14	2
		Foot Valve		FV-DH340			
Flat face 	QLX40 (TD40, COP44G)	110	4 3/8	QLX40P110R25VM	8 x φ14	7 x φ14	2
		115	4 1/2	QLX40P115R25VM	8 x φ14	7 x φ14	2
		120	4 5/7	QLX40P120R25VM	8 x φ14	7 x φ14	2
		127	5	QLX40P127R25VM	8 x φ16	8 x φ14	2
		Foot Valve		FV-TD40			
Concave 	QLX40 (TD40, COP44G)	110	4 3/8	QLX40P110R65VM	8 x φ14	6 x φ14	2
		115	4 1/2	QLX40P115R65VM	8 x φ14	7 x φ14	2
		120	4 5/7	QLX40P120R65VM	8 x φ14	7 x φ14	2
		127	5	QLX40P127R65VM	8 x φ16	8 x φ14	2
		Foot Valve		FV-TD40			

For 5" Hammers

Face design	Shank	Gauge Diameter		Product code	Gauge Button	Face Button	Flushing holes
		mm	Inch		No x Dia(mm)	No x Dia(mm)	
Flat face 	QL50	130	5 1/8	QL50P130R25VM	8 x φ16	8 x φ14	2
		134	5 1/4	QL50P134R25VM	8 x φ16	9 x φ14	2
		140	5 1/2	QL50P140R25VM	8 x φ16	10 x φ14	2
		146	5 3/4	QL50P146R25VM	8 x φ16	10 x φ14	2
		152	6	QL50P152R25VM	8 x φ17	9 x φ16	2
Concave 	QL50	Foot Valve		FV-QL50			
		130	5 1/8	QL50P130R65VM	8 x φ16	8 x φ14	2
		134	5 1/4	QL50P134R65VM	8 x φ16	8 x φ14	2
		140	5 1/2	QL50P140R65VM	8 x φ16	8 x φ14	2
		146	5 3/4	QL50P146R65VM	8 x φ16	9 x φ14	2
Flat face 	DHD350	152	6	QL50P152R65VM	8 x φ17	10 x φ16	2
		Foot Valve		FV-QL50			
		130	5 1/8	DH350P130R25VM	8 x φ16	8 x φ14	2
		134	5 1/4	DH350P134R25VM	8 x φ16	9 x φ14	2
		140	5 1/2	DH350P140R25VM	8 x φ16	10 x φ14	2
Concave 	DHD350	146	5 3/4	DH350P146R25VM	8 x φ16	10 x φ14	2
		152	6	DH350P152R25VM	8 x φ17	9 x φ16	2
		Foot Valve		FV-DH350			
		130	5 1/8	DH350P130R65VM	8 x φ16	8 x φ14	2
		134	5 1/4	DH350P134R65VM	8 x φ16	8 x φ14	2
Flat face 	DHD350	140	5 1/2	DH350P140R65VM	8 x φ16	8 x φ14	2
		146	5 3/4	DH350P146R65VM	8 x φ16	9 x φ14	2
		152	6	DH350P152R65VM	8 x φ17	10 x φ16	2
		Foot Valve		FV-DH350			

DTH Bits

For 6" Hammers

Face design	Shank	Gauge Diameter		Product code	Gauge Button	Face Button	Flushing holes
		mm	Inch		No x Dia(mm)	No x Dia(mm)	
Concave 	QL60	152	6	QL60P152R65VM	8 x ϕ 17	10 x ϕ 16	2
		156	6 1/8	QL60P156R65VM	8 x ϕ 19	10 x ϕ 16	2
		159	6 1/4	QL60P159R65VM	8 x ϕ 19	10 x ϕ 16	2
		165	6 1/2	QL60P165R65YM	9 x ϕ 19	10 x ϕ 17	3
		171	6 3/4	QL60P171R65YM	9 x ϕ 19	10 x ϕ 17	3
		178	7	QL60P178R65YM	9 x ϕ 19	11 x ϕ 17	3
		Foot Valve		FV-QL60			
Concave 	DHD360	152	6	DH360P152R65VM	8 x ϕ 17	10 x ϕ 16	2
		156	6 1/8	DH360P156R65VM	8 x ϕ 19	10 x ϕ 16	2
		159	6 1/4	DH360P159R65VM	8 x ϕ 19	10 x ϕ 16	2
		165	6 1/2	DH360P165R65YM	9 x ϕ 19	10 x ϕ 17	3
		171	6 3/4	DH360P171R65YM	9 x ϕ 19	10 x ϕ 17	3
		178	7	DH360P178R65YM	9 x ϕ 19	11 x ϕ 17	3
		Foot Valve		FV-DH360			
Concave 	SD6	152	6	SD6P152R65VM	8 x ϕ 17	10 x ϕ 16	2
		156	6 1/8	SD6P156R65VM	8 x ϕ 19	10 x ϕ 16	2
		159	6 1/4	SD6P159R65VM	8 x ϕ 19	10 x ϕ 16	2
		165	6 1/2	SD6P165R65YM	9 x ϕ 19	10 x ϕ 17	3
		171	6 3/4	SD6P171R65YM	9 x ϕ 19	10 x ϕ 17	3
		178	7	SD6P178R65YM	9 x ϕ 19	11 x ϕ 17	3
		Foot Valve		FV-SD6			

For 8" Hammers

Face design	Shank	Gauge Diameter		Product code	Gauge Button	Face Button	Flushing holes
		mm	Inch		No x Dia(mm)	No x Dia(mm)	
Concave 	QL80	203	8	QL80P203R65YM	9 x ϕ 19	12 x ϕ 19	3
		216	8 1/2	QL80P216R65YM	9 x ϕ 19	13 x ϕ 19	3
		229	9	QL80P229R65YM	12 x ϕ 19	17 x ϕ 19	3
		241	9 1/2	QL80P241R65YM	12 x ϕ 19	19 x ϕ 19	3
		254	10	QL80P254R65YM	12 x ϕ 19	21 x ϕ 19	3
		Foot Valve		FV-QL80			
Concave 	DHD380	203	8	DH380P203R65YM	9 x ϕ 19	12 x ϕ 19	3
		216	8 1/2	DH380P216R65YM	9 x ϕ 19	13 x ϕ 19	3
		229	9	DH380P229R65YM	12 x ϕ 19	17 x ϕ 19	3
		241	9 1/2	DH380P241R65YM	12 x ϕ 19	19 x ϕ 19	3
		254	10	DH380P254R65YM	12 x ϕ 19	21 x ϕ 19	3
		Foot Valve		FV-DH380			
Concave 	SD8	203	8	SD8P203R65YM	9 x ϕ 19	12 x ϕ 19	3
		216	8 1/2	SD8P216R65YM	9 x ϕ 19	13 x ϕ 19	3
		229	9	SD8P229R65YM	12 x ϕ 19	17 x ϕ 19	3
		241	9 1/2	SD8P241R65YM	12 x ϕ 19	19 x ϕ 19	3
		254	10	SD8P254R65YM	12 x ϕ 19	21 x ϕ 19	3
		Foot Valve		FV-SD8			

Casing Advancement Systems



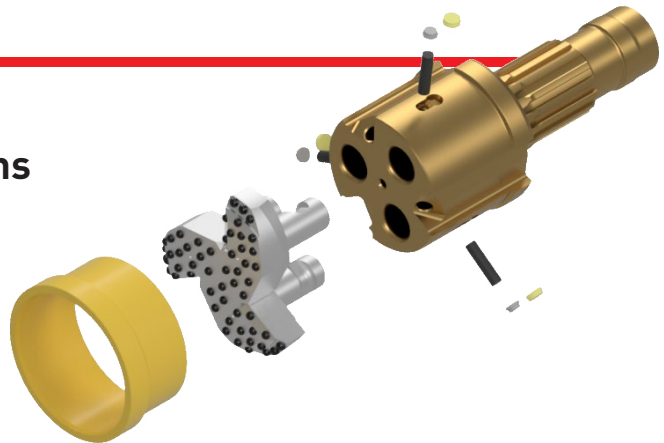
Casing Advancement Systems

Under Reaming Systems

Economical and environmentally conscious systems for soft to medium-hard ground conditions by making the bit retrievable after drilling

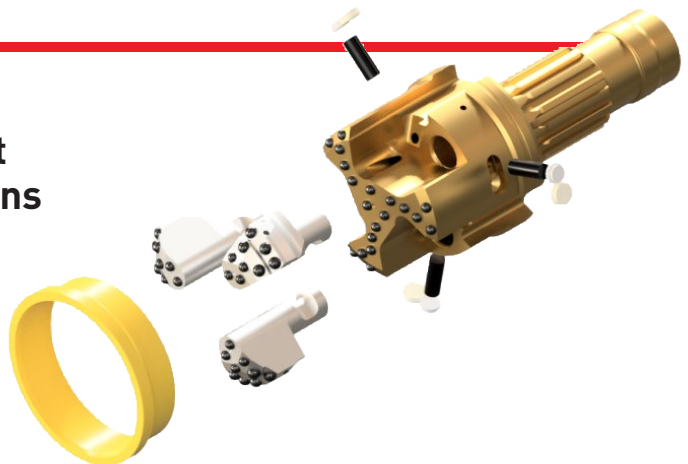
SUPER MAXBIT

- Balanced drilling model
- Suitable for soft ground conditions
- Adaptable from vertical to horizontal drilling



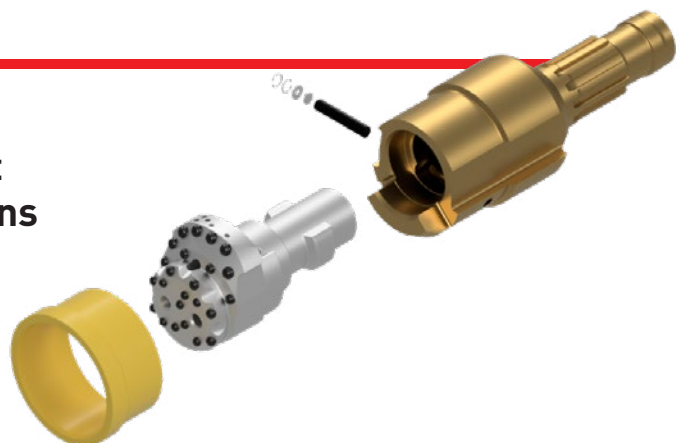
NEW MAXBIT G-model

- Balanced drilling model
- High drilling performance in soft to medium-hard ground conditions
- Compatible with thick-walled steel pipes



SUPER MAXBIT E-model

- Eccentric drilling model
- High drilling performance in soft to medium-hard ground conditions



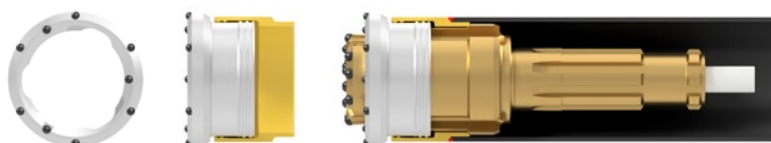
Ring Bit Systems

High speed and straight drilling in wide range of ground conditions

ULTRA MAXBIT

Single Pass

- For short drilling depths
- Permanent casing
- Threaded ring-set



Normal

- For long drilling depths
- Permanent casing
- Threaded ring-set



Multi Use

- Retrievable casing
- Interlinked ring-set



Big Bore

- Large pass through
- Permanent casing
- Interlinked ring-set



I-Type

- Economic system
- Permanent casing
- Independent ring bit



Construction Method

Construction Method	Illustration	Usage Description
Geothermal		· Heat pump · Binary power generation (geothermal heat generation, steam generation) · Air conditioning · Geoloops
Water Well		· Residential · Agricultural · Municipal · De-watering
Pipe Roof		Preventing collapse of weak ground
Foundation (Pile wall)		· Interlinked Pipe Pile Walls · Solitary Pipe Pile Walls
Foundation (Piling)		· Micropiles · Drill-through Rock Sockets
Anchor		· Rock bolts · Rockfall prevention nets · Drainage

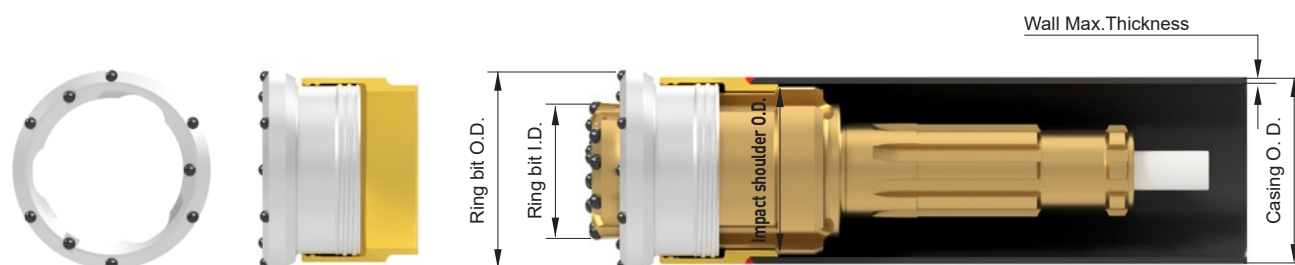
Selection Guide

Type	Model	Photo	Specifications	Advantage	Drilling direction Horizontal and Vertical	Ring set connection
Under reamer system	SMB Jump to P.48		Our original underreamer, the SMB is best suited for shallower depths and will drill through a variety of formation types	Like all underreamers, the bit is removed after the casing is set. It is versatile and supports a wide range of applications, particularly suitable for sandy soils, soft rock, and hard clay bearing formations	Vertical (Up/Down) ✓	-
	SMB-G		Our second generation underreamer was designed to achieve greater depths while also allowing for larger drilling gauge	Carbide buttons incorporated into the device body makes the SMB-G a better choice for drilling harder rock and greater depths	Vertical (Up/Down) ✓	-
	NMB-G Jump to P.46		Similar in appearance and function to the SMB-G. The NMB-G is our newest and strongest underreamer	The NMB-G was designed with increase wing size, increased shank diameter and increased retaining pin diameter. This robust new design is ready to tackle your hardest casing advancement jobs. It is applicable to thicker wall casings	Vertical (Up/Down) ✓	-
	SMB-E Jump to P.50		Eccentric underreaming system designed for your most challenging projects	Our SMB-E integrates a single piece pilot bit/reamer for added strength and cost savings. Our easy to maintain retaining pin system takes the headache out of servicing the device	Vertical (Up/Down) ✓ Horizontal - May curve Diagonal - May curve	-
Ring bit system	UMB Single Pass Jump to P.38		Economical single pass ring bit system when the casing is to be left in the hole	Applicable to a wide range of geological conditions. Single pass Non-retrievable ring bits are economical and versatile	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Threaded Connection 
	UMB Normal Jump to P.39		A step up in strength from our Single-pass ring bit, the Normal model incorporates a stronger ring bit to achieve greater casing depth	Applicable to a wide range of geological conditions, the Normal model system does allow for casing retrieval in shallow holes or consolidated ground	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Threaded Connection 
	UMB Multi Use Jump to P.40		The Multi Use ring bit is our Heavy Duty interlinked assembly that allows for greater drilling depths in challenging formations and easy removal of pipe from the hole	Applicable to a wide range of geological conditions and well suited when casing is to be retrieved and reused	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Interlink Type 
	UMB Big bore Jump to P.41		The Big bore system incorporates the same Heavy Duty interlinked ring bit assembly as the Multi Use., but allows for a larger ring bit pass through diameter	Large ID Heavy Duty ring bit assemblies allow for telescoping of multiple diameters of casing and facilitate large bit pass through. Ideal for water well, foundation, and mining applications	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Interlink Type 
	UMB I type Jump to P.42		"Multi-Function Simultaneous Casing Drilling System. Ring Bit Simultaneous Casing Drilling System (Economical product with non-connected ring and shoe)"	"Designed for shallow hole drilling. The ring set is affordable and economical."	Vertical (Up/Down) ✓ Horizontal - Diagonal -	Non-connected 
	UMB Horizontal Drilling		All of the advantages and options of the Standard UMB systems but designed for horizontal applications	A specialized drilling system for horizontal drilling	Vertical (Up/Down) - Horizontal ✓ Diagonal -	Threaded Connection 
	Drill Through		Same Heavy Duty construction as the Big Bore system, our Drill Through system allows the pilot bit to drill past the ring bit eliminating the need to change bits during the drilling process	Designed to speed up the drilling process when a rock socket is required for micropiles or when drilling into bedrock for water wells	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Interlink Type 
Option	UMB Venturi	 Air Bolw	Designed for projects where sensitive foundations are nearby	Due to the recessed pilot bit and up facing flushing ports, the air discharge is directed off of the drilling face protecting neighboring foundations. The Venturi design also acts as a vacuum to evacuate loose formations without hole collapse.	Vertical (Up/Down) ✓ Horizontal ✓ Diagonal ✓	Compatible with Various Types

Applications						Applicable geological conditions							
Geothermal	Water Wells	Pipe Roofs	Foundation (Pile wall)	Foundation (Piling)	Anchoring	Soil and Sand	Soft rock(1) ($q_u < 5N/mm^2$)	Soft rock(2) ($q_u = 5-20N/mm^2$)	Medium Hard Rock ($q_u = 20-60N/mm^2$)	Hard Rock(1) ($q_u = 60N/mm^2$)	Hard Rock(2) Unweathered, Fresh State	Mixed Soil with Cobbles ($\phi 64-255mm$)	Bolder ($\phi 256mm$)
✓	✓	✓		✓		✓	✓	✓					
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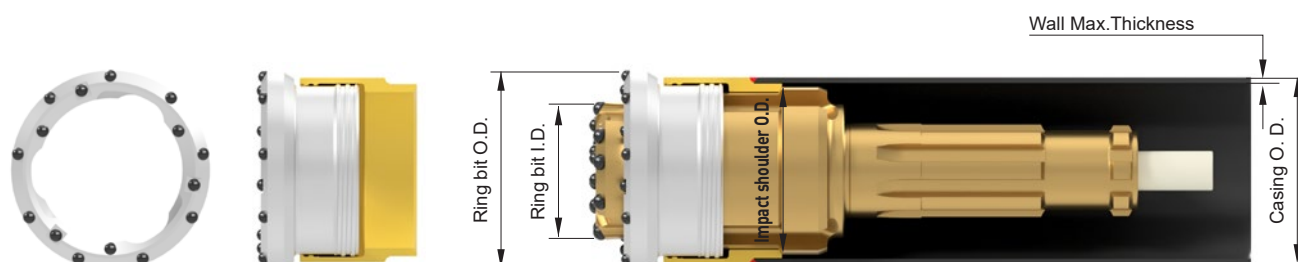
Single Pass



Casing OD		Wall max. thickness		Type	Ring bit O.D.		Ring bit I.D.		Impact shoulder O.D.		Hammer size	System Product code	Ring-set Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch			
114.3	4 1/2"	10.0	0.39"	072A	126	4.96"	72	2.83"	92	3.62"	3	US072A-03-R-035	US072A-R-0035RS
		8.0	0.31"	072B	126	4.96"	72	2.83"	95.5	3.76"	3	US072B-03-R-090	US072B-R-0090RS
		6.35	0.25"	080A	126	4.96"	80	3.15"	99.5	3.92"	3	US080A-03-R-341	US080A-R-0341RS
		6.0	0.24"	082A	126	4.96"	82	3.23"	100	3.94"	3	US082A-03-R-372	US082A-R-0372RS
139.7	5 1/2"	10.0	0.39"	097A	150	5.91"	97	3.82"	117.5	4.63"	4	US097A-04-R-037	US097A-R-0037RS
		6.6	0.26"	105A	152	5.98"	105	4.13"	125	4.92"	4	US105A-04-R-101	US105A-04-0101RS
168.3	6 5/8"	12.7	0.50"	118A	178	7.01"	118	4.65"	140	5.51"	5	US118A-05-R-041	US118A-R-0041RS
		8.0	0.31"	126B	178	7.01"	126	4.96"	146	5.75"	5	US126B-05-R-380	US126B-R-0380RS
		6.35	0.25"	130A	178	7.01"	130	5.12"	153	6.02"	5	US130A-05-R-1250	US130A-R-1250RS
		6.0	0.24"	130B	178	7.01"	130	5.12"	154	6.06"	5	US130B-05-R-1251	US130B-R-1251RS
219.1	8 5/8"	12.7	0.50"	170A	232	9.13"	170	6.69"	191	7.52"	6	US170A-06-R-047	US170A-R-0047RS
		6.4	0.25"	178C	234	9.21"	178	7.01"	201	7.91"	6	US178C-06-R-1253	US178C-R-1253RS
273.0	10 3/4"	12.7	0.50"	219A	284	11.18"	219	8.62"	245	9.65"	8	US219A-08-R-050	US219A-R-0050RS
		10.0	0.39"	219A	284	11.18"	219	8.62"	245	9.65"	8	US219B-08-R-414	US219B-R-0414RS
		8.0	0.31"	232A	284	11.18"	232	9.13"	255	10.04"	8	US232A-08-R-061	US232A-R-0061RS
323.9	12 3/4"	16.0	0.63"	265B	338	13.31"	265	10.43"	289	11.38"	10	US265B-10-R-166	US265B-R-0166RS
											8	US265B-08-R-1254	
		12.7	0.50"	273A	338	13.31"	273	10.75"	296	11.65"	10	US273A-10-R-519	US273A-R-0519RS
											8	US273A-08-R-051	
		10.0	0.39"	273C	338	13.31"	273	10.75"	298	11.73"	10	US273C-10-R-654	US273C-R-0654RS
											8	US273C-08-R-439	
355.6	14"	8.0	0.31"	281A	338	13.31"	281	11.06"	305	12.01"	10	US281A-10-R-1260	US281A-R-0214RS
											8	US281A-08-R-214	
		12.7	0.50"	300A	370	14.57"	300	11.81"	327	12.87"	12	US300A-12-R-1261	US300A-R-1261RS
											10	US300A-10-R-1262	
		9.5	0.37"	300B	370	14.57"	300	11.81"	333.5	13.13"	12	US300B-12-R-1263	US300B-R-0487RS
											10	US300B-10-R-487	
406.4	16"	12.7	0.50"	349A	420	16.54"	349	13.74"	378	14.88"	12	US349A-12-R-836	US349A-R-0835RS
											12	US354A-12-R-105	US354A-R-0105RS
		8.0	0.31"	354E	420	16.54"	354	13.94"	383	15.08"	12	US354E-12-R-774	US354E-R-0774RS
											18	US445B-18-R-1119	US445B-R-0149RS
508.0	20"	16.0	0.63"	445B	521	20.51"	445	17.52"	473	18.62"	15	US445B-15-R-1053	
											18	US445A-18-R-456	
		12.7	0.50"	445A	521	20.51"	445	17.52"	473	18.62"	15	US445A-15-R-111	US445A-R-0111RS
											18	US445A-18-R-129	
609.6	24"	16.0	0.63"	545A	625	24.61"	545	21.46"	574	22.60"	18	US545A-18-R-129	US545A-R-0129RS
		12.7	0.50"	552A	625	24.61"	552	21.73"	580	22.83"	18	US552A-18-R-1272	US552A-R-1272RS

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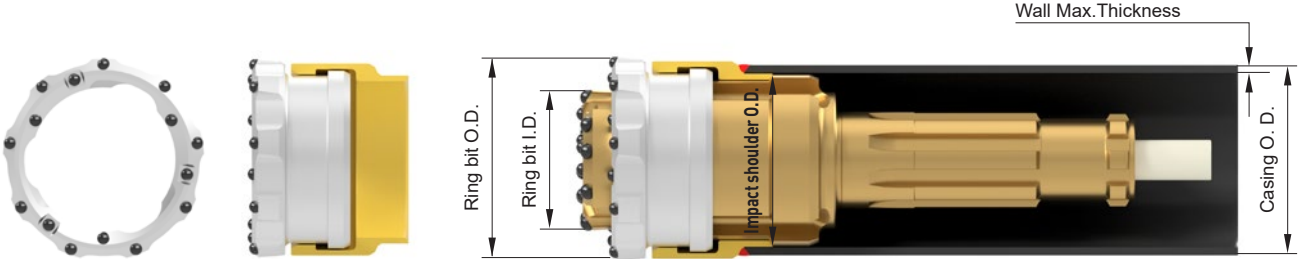
Normal



Casing OD		Wall max. thickness		Type	Ring bit O.D.		Ring bit I.D.		Impact shoulder O.D.		Hammer size	System Product code	Ring-set Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch			
114.3	4 1/2"	10.0	0.39"	072A	126	4.96"	72	2.83"	92	3.62"	3	UN072A-03-R-077	UN072A-R-0077RS
		8.0	0.31"	072B	126	4.96"	72	2.83"	95.5	3.76"	3	UN072B-03-R-368	UN072B-R-0368RS
		6.35	0.25"	080A	126	4.96"	80	3.15"	95.5	3.76"	3	UN080A-03-R-249	UN080A-R-0249RS
		6.0	0.24"	082A	126	4.96"	82	3.23"	100	3.94"	3	UN082A-03-R-373	UN082A-R-0373RS
139.7	5 1/2"	10.0	0.39"	097A	150	5.91"	97	3.82"	117.5	4.63"	4	UN097A-04-R-080	UN097A-R-0080RS
		6.6	0.26"	105A	152	5.98"	105	4.13"	125	4.92"	4	UN105A-04-R-375	UN105A-R-0243RS
168.3	6 5/8"	12.7	0.50"	118A	178	7.01"	118	4.65"	140	5.51"	5	UN118A-05-R-081	UN118A-R-0081RS
		8.0	0.31"	126B	178	7.01"	126	4.96"	146	5.75"	5	UN126B-05-R-381	UN126B-R-0381RS
		6.35	0.25"	130A	178	7.01"	130	5.12"	153	6.02"	5	UN130A-05-R-1002	UN130A-R-1002RS
		6.0	0.24"	130B	178	7.01"	130	5.12"	154	6.06"	5	UN130B-05-R-1252	UN130B-R-1252RS
219.1	8 5/8"	12.7	0.50"	170A	231	9.09"	170	6.69"	191	7.52"	6	UN170A-06-R-392	UN170A-R-0392RS
		6.4	0.25"	178C	234	9.21"	178	7.01"	201	7.91"	6	UN178C-06-R-1003	UN178C-R-1003RS
273.0	10 3/4"	12.7	0.50"	219A	284	11.18"	219	8.62"	245	9.65"	8	UN219A-08-R-097	UN219A-R-0097RS
		10.0	0.39"	219A	284	11.18"	219	8.62"	245	9.65"	8	UN219B-08-R-415	UN219B-R-0415RS
		8.0	0.31"	228A	284	11.18"	228	8.98"	252.5	9.94"	8	UN228A-08-R-054	UN228A-R-0054RS
				232A	284	11.18"	232	9.13"	255	10.04"	8	UN232A-08-R-034	UN232A-R-0034RS
323.9	12 3/4"	16.0	0.63"	265B	338	13.31"	265	10.43"	289	11.38"	10	UN265B-10-R-1255	UN265B-R-1255RS
											8	UN265B-08-R-1256	
		12.7	0.50"	273A	338	13.31"	273	10.75"	296	11.65"	10	UN273A-10-R-1257	UN273A-R-1257RS
											8	UN273A-08-R-1258	
		10.0	0.39"	273C	338	13.31"	273	10.75"	298	11.73"	10	UN273C-10-R-1259	UN273C-R-0440RS
											8	UN273C-08-R-440	
		8.0	0.31"	281A	338	13.31"	281	11.06"	305	12.01"	12	UN281A-12-R-062	UN281A-R-0062RS
											10	UN281A-10-R-091	
355.6	14"	12.7	0.50"	300A	370	14.57"	300	11.81"	327	12.87"	12	UN300A-12-R-055	UN300A-R-0055RS
											10	UN300A-10-R-198	
		9.5	0.37"	300B	370	14.57"	300	11.81"	333.5	13.13"	12	UN300B-12-R-445	UN300B-R-0445RS
											10	UN300B-10-R-446	
		8.0	0.31"	300C	370	14.57"	300	11.81"	333.5	13.13"	12	UN300C-12-R-347	UN300C-R-0347RS
											10	UN300C-10-R-1266	
406.4	16"	12.7	0.50"	349A	420	16.54"	349	13.74"	378	14.88"	12	UN349A-12-R-1267	UN349A-R-1141RS
		8.0	0.31"	354E	420	16.54"	354	13.94"	383	15.08"	12	UN354E-12-R-775	UN354E-R-0775RS
508.0	20"	16.0	0.63"	445B	521	20.51"	445	17.52"	473	18.62"	18	UN445B-18-R-1268	UN445B-R-1268RS
											15	UN445B-15-R-1269	
		12.7	0.50"	445A	521	20.51"	445	17.52"	473	18.62"	18	UN445A-18-R-1270	UN445A-R-1270RS
											15	UN445A-15-R-1271	
609.6	24"	16.0	0.63"	545A	625	24.61"	545	21.46"	574	22.60"	18	UN545A-18-R-526	UN545A-R-0526RS
		12.7	0.50"	552A	625	24.61"	552	21.73"	580	22.83"	18	UN552A-18-R-1273	UN552A-R-1273RS

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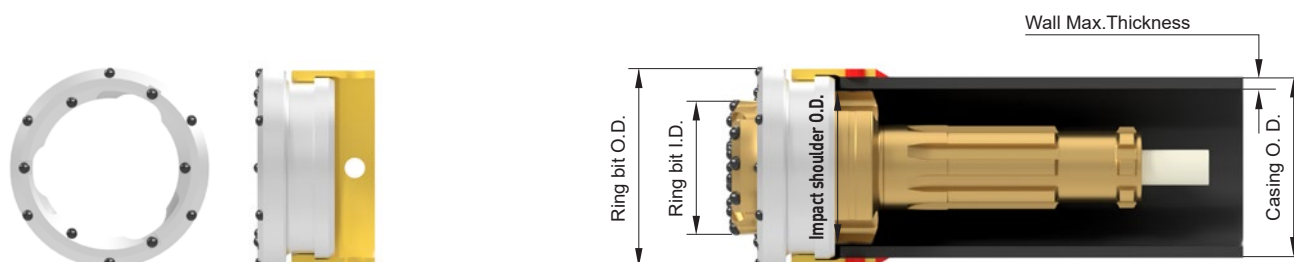
Multi-Use



Casing OD		Wall max. thickness		Type	Ring bit O.D.		Ring bit I.D.		Impact shoulder O.D.		Hammer size	System Product code	Ring-set Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch			
114.3	4 1/2"	10.0	0.39"	072W	122	4.80"	72	2.83"	92	3.62"	3	UM072W-03-R-285	UM072W-R-0285RS
139.7	5 1/2"	10.0	0.39"	097W	147	5.79"	97	3.82"	117.5	4.63"	4	UM097W-04-R-286	UM097W-R-0286RS
168.3	6 5/8"	12.7	0.50"	118W	175	6.89"	118	4.65"	140	5.51"	5	UM118W-05-R-377	UM118W-R-0377RS
219.1	8 5/8"	12.7	0.50"	170W	227	8.94"	170	6.69"	191	7.52"	6	UM170W-06-R-289	UM170W-R-0289RS
273.0	10 3/4"	12.7	0.50"	219W	281	11.06"	219	8.62"	245	9.65"	8	UM219W-08-R-413	UM219W-R-0413RS
323.9	12 3/4"	12.7	0.50"	273W	333	13.11"	273	10.75"	296	11.65"	8	UM273W-08-R-215	UM273W-R-0215RS
355.6	14"	12.7	0.50"	300W	370	14.57"	300	11.81"	327	12.87"	12	UM300W-12-R-443	UM300W-R-0443RS
											10	UM300W-10-R-444	
406.4	16"	12.7	0.50"	349W	420	16.54"	349	13.74"	378	14.88"	12	UM349W-12-R-1026	UM349W-R-1026RS
				354X	420	16.54"	354	13.94"	378	14.88"	12	UM354X-12-R-263	UM354X-R-0263RS
508.0	20"	16.0	0.63"	445W	521	20.51"	445	17.52"	473	18.62"	18	UM445W-18-R-453	UM445W-R-0451RS
											15	UM445W-15-R-452	
609.6	24"	16.0	0.63"	545W	625	24.61"	545	21.46"	574	22.60"	18	UM545W-18-R-435	UM545W-R-0435RS

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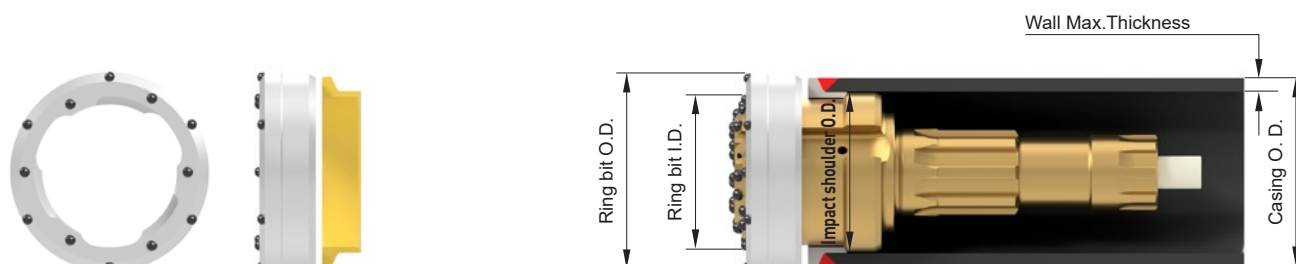
Big Bore



Casing OD		Wall max. thickness		Type	Ring bit Type	Ring bit O.D.		Ring bit I.D.		Impact shoulder O.D.		Hammer size	System Product code	Ring-set Product code
mm	Inch	mm	Inch			mm	Inch	mm	Inch	mm	Inch			
114.3	4 1/2"	10.0	0.39"	082L	Single pass	137	5.39"	82	3.23"	92	3.62"	3	UB082L-03-R-1274	UB082L-R-1274RS
		8.0	0.31"	086L	Single pass	137	5.39"	86	3.39"	96	3.78"	3	UB086L-03-R-1275	UB086L-R-0222RS
		6.0	0.24"	088L	Single pass	137	5.39"	88	3.46"	100	3.94"	3	UB088L-03-R-1173	UB088L-R-1173RS
139.7	5 1/2"	10.0	0.39"	106L	Single pass	161	6.34"	106	4.17"	118	4.65"	4	UB106L-04-R-1276	UB106L-R-0223RS
		5.6	0.22"	116L	Single pass	161	6.34"	116	4.57"	127	5.00"	4	UN116L-04-R-230	UB116L-R-0230RS
168.3	6 5/8"	10.0	0.39"	135L	Single pass	189	7.44"	135	5.31"	146	5.75"	5	UB135L-05-R-1277	UB135L-R-1277RS
		8.0	0.31"	137L	Normal	189	7.44"	137	5.39"	150	5.91"	5	UB137L-05-R-659	UB137L-R-0659RS
		6.35	0.25"	141M	Single pass	189	7.44"	141	5.55"	154	6.06"	5	UB141M-05-R-247	UB141L-R-0231RS
					Normal	189	7.44"	141	5.55"	154	6.06"	5	UB141M-05-R-246	UB141M-R-0246RS
219.1	8 5/8"	10.0	0.39"	187L	Single pass	242	9.53"	187	7.36"	197	7.76"	6	UB187L-06-R-1278	UB187L-R-1278RS
		6.35	0.25"	192L	Single pass	242	9.53"	192	7.56"	204	8.03"	6	UB192L-06-R-235	UB192L-R-0235RS
					Normal	242	9.53"	192	7.56"	204	8.03"	6	UB192L-06-R-537	UB192L-R-0537RS
273.0	10 3/4"	12.7	0.50"	232L	Single	299	11.77"	232	9.13"	245	9.65"	8	UB232L-08-R-1279	UB232L-R-1279RS
		10.0	0.39"	238L	Normal	297	11.69"	238	9.37"	251	9.88"	8	UB238L-08-R-634	UB238L-R-0634RS
		8.0	0.31"	242L	Single pass	299	11.77"	242	9.53"	255	10.04"	8	UB242L-08-R-237	UB242L-R-0237RS
					Single pass (HD)	299	11.77"	242	9.53"	255	10.04"	8	UB242L-08-R-699	UB242L-R-0699RS
					Normal	299	11.77"	242	9.53"	255	10.04"	8	UB242L-08-R-743	UB242L-R-0743RS
323.9	12 3/4"	12.7	0.50"	279L	Single pass	350	13.78"	279	10.98"	296	11.65"	10	UB279L-10-R-1280	UB279L-R-1280RS
		10.0	0.39"	284L	Single pass	350	13.78"	284	11.18"	301	11.85"	8	UB279L-08-R-1281	
												10	UB284L-10-R-1282	UB284L-R-0238RS
					Normal	350	13.78"	284	11.18"	301	11.85"	8	UB284L-08-R-238	
												10	UB284L-10-R-624	
355.6	14"	10.0	0.39"	315L	Normal	380	14.96"	315	12.40"	332	13.07"	8	UB284L-08-R-710	UB284L-R-0624RS
												12	UB315L-12-R-355	
												10	UB315L-10-R-322	
406.4	16"	12.7	0.50"	360L	Normal	435	17.13"	360	14.17"	377	14.84"	12	UB315L-08-R-709	UB315L-R-0355RS
508.0	20"	16.0	0.63"	452L	Normal	542	21.34"	452	17.80"	472	18.58"	18	UB360L-12-R-768	
		12.7	0.50"	460L	Normal	542	21.34"	460	18.11"	479	18.86"	18	UB452L-18-R-1166	
609.6	24"	16.0	0.63"	550L	Normal	644	25.35"	550	21.65"	570	22.44"	18	UB460L-18-R-1285	UB460L-R-1285RS
		12.7	0.50"	560L	Normal	644	25.35"	560	22.05"	580	22.83"	18	UB550L-18-R-1286	UB550L-R-1286RS
													UB560L-18-R-1287	UB560L-R-1287RS

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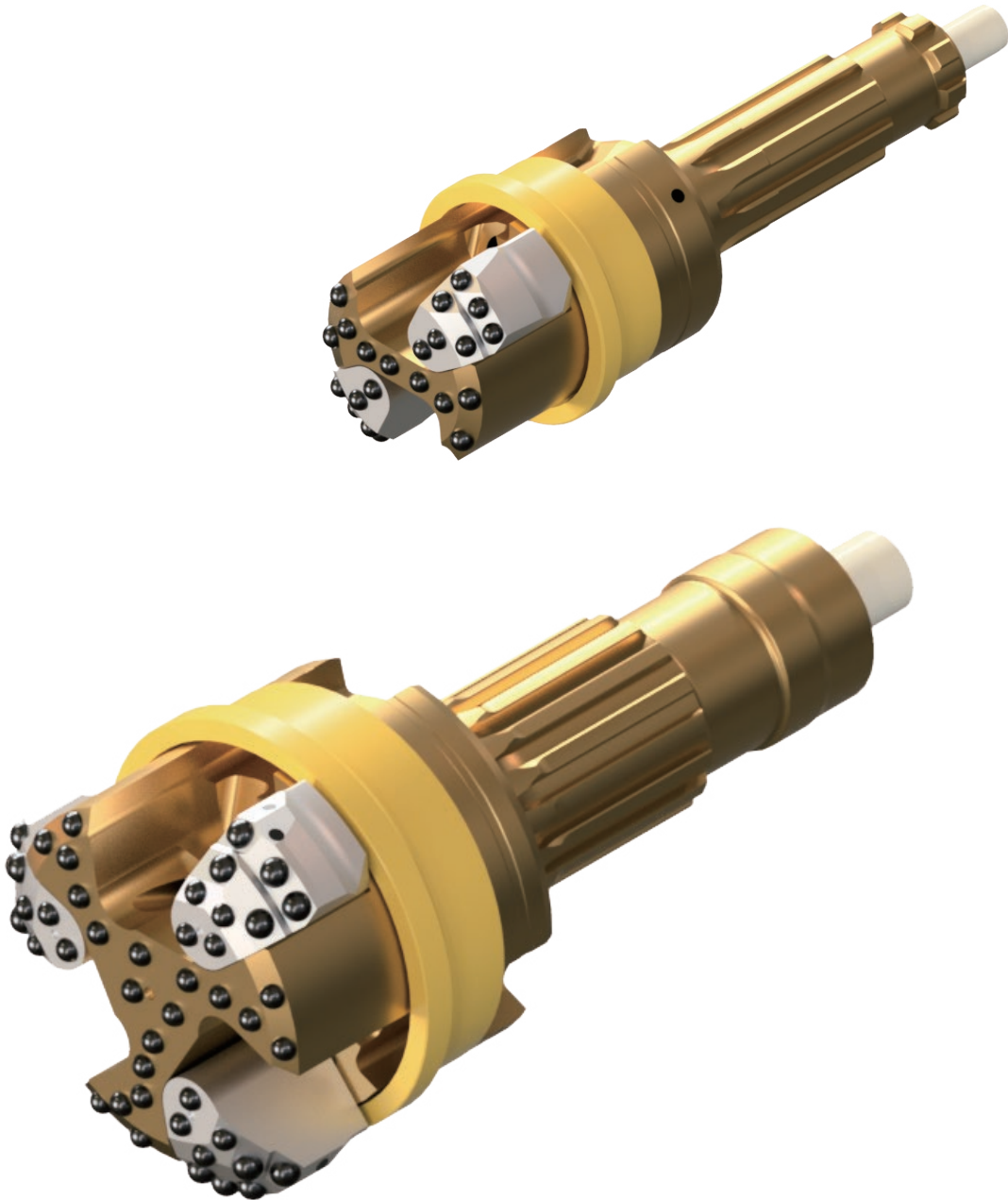
I Type



Casing OD		Wall max. thickness		Type	Ring bit O.D.		Ring bit I.D.		Impact shoulder O.D.		Hammer size	System Product code	Ring-set Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch			
114.3	4 1/2"	10.0	0.39"	066A	126	4.96"	66	2.60"	90	3.54"	3	UI066A-03-R-1291	UI066A-R-1291RS
		8.0	0.31"	070A	126	4.96"	70	2.76"	94	3.70"	3	UI070A-03-R-1292	UI070A-R-1292RS
139.7	5 1/2"	10.0	0.39"	090A	150	5.91"	90	3.54"	115.5	4.55"	4	UI090A-04-R-1293	UI090A-R-1293RS
		8.0	0.31"	095A	150	5.91"	95	3.74"	119.5	4.70"	4	UI095A-04-R-1294	UI095A-R-1294RS
168.3	6 5/8"	12.7	0.50"	111C	178	7.01"	111	4.37"	139	5.47"	5	UI111C-05-R-1295	UI111C-R-1295RS
		10.0	0.39"	117A	178	7.01"	117	4.61"	144	5.67"	5	UI117A-05-R-1296	UI117A-R-1296RS
		8.0	0.31"	117B	178	7.01"	117	4.61"	144	5.67"	5	UI117B-05-R-1297	UI118B-R-1297RS
		12.7	0.50"	160A	230	9.06"	160	6.30"	189	7.44"	6	UI160A-06-R-1298	UI160A-R-1298RS
219.1	8 5/8"	10.0	0.39"	166A	230	9.06"	166	6.54"	195	7.68"	6	UI166A-06-R-1299	UI166A-R-1299RS
		8.0	0.31"	166B	230	9.06"	166	6.54"	195	7.68"	6	UI166B-06-R-1300	UI166B-R-1300RS
		12.7	0.50"	214A	287	11.30"	214	8.43"	243	9.57"	8	UI214A-08-R-1301	UI214A-R-1301RS
273.0	10 3/4"	10.0	0.39"	220A	287	11.30"	220	8.66"	248	9.76"	8	UI220A-08-R-1302	UI220A-R-1302RS
		8.0	0.31"	220B	287	11.30"	220	8.66"	248	9.76"	8	UI220B-08-R-1303	UI220B-R-1303RS
		12.7	0.50"	263A	338	13.31"	263	10.35"	293	11.54"	10	UI263A-10-R-1304	UI263A-R-1304RS
323.9	12 3/4"	10.0	0.39"	268A	338	13.31"	268	10.55"	298	11.73"	10	UI268A-10-R-1305	UI268A-R-1305RS
		8.0	0.31"	268B	338	13.31"	268	10.55"	298	11.73"	10	UI268B-10-R-1306	UI268B-R-1306RS
355.6	14"	14.2	0.56"	291A	370	14.57"	291	11.46"	321.5	12.66"	12	UI291A-12-R-1306	UI291A-R-1307RS
											10	UI291A-10-R-1308	
406.4	16"	16.0	0.63"	336A	420	16.54"	336	13.23"	369	14.53"	12	UI336A-12-R-1309	UI336A-R-1309RS
		12.7	0.50"	342B	420	16.54"	342	13.46"	375	14.76"	12	UI342B-12-R-1310	UI342B-R-1310RS
		10.0	0.39"	342C	420	16.54"	342	13.46"	375	14.76"	12	UI342C-12-R-1311	UI342C-R-1311RS
508.0	20"	16.0	0.63"	435A	521	20.51"	435	17.13"	470.5	18.52"	18	UI435A-18-R-1312	UI435A-R-1312RS
		12.7	0.50"	441A	521	20.51"	441	17.36"	476.5	18.76"	18	UI441A-18-R-1313	UI441A-R-1313RS
		10.0	0.39"	447A	521	20.51"	447	17.60"	482.5	19.00"	18	UI447A-18-R-1314	UI447A-R-1314RS
		8.0	0.31"	447B	521	20.51"	447	17.60"	482.5	19.00"	18	UI447B-18-R-1315	UI447B-R-1315RS
609.6	24"	16.0	0.63"	534A	625	24.61"	534	21.02"	572	22.52"	18	UI534A-18-R-1316	UI534A-R-1316RS
		12.7	0.50"	540A	625	24.61"	540	21.26"	578	22.76"	18	UI540A-18-R-1317	UI540A-R-1317RS
		10.0	0.39"	546A	625	24.61"	546	21.50"	584	22.99"	18	UI546A-18-R-1318	UI546A-R-1318RS
		8.0	0.31"	546B	625	24.61"	546	21.50"	584	22.99"	18	UI546B-18-R-1319	UI546B-R-1319RS

NEW MAXBIT G-model

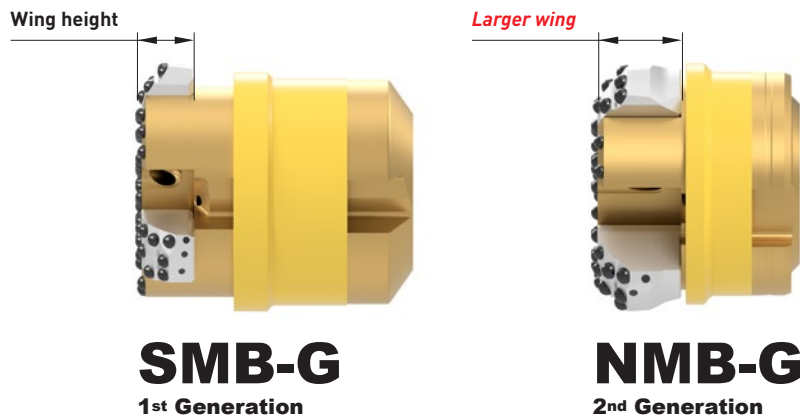
Strongest underreamer and upgraded system of Super MaxBit G-model



What has been upgraded ?

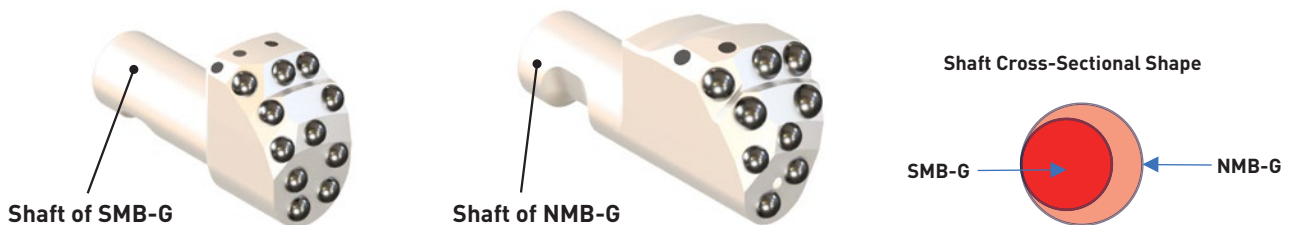
1. Increased wing size

By increasing the wing thickness by 9-30%, the contact area with the device was expanded. This slows down the wear progress on the contact surface and makes it suitable for use in harder ground formations.



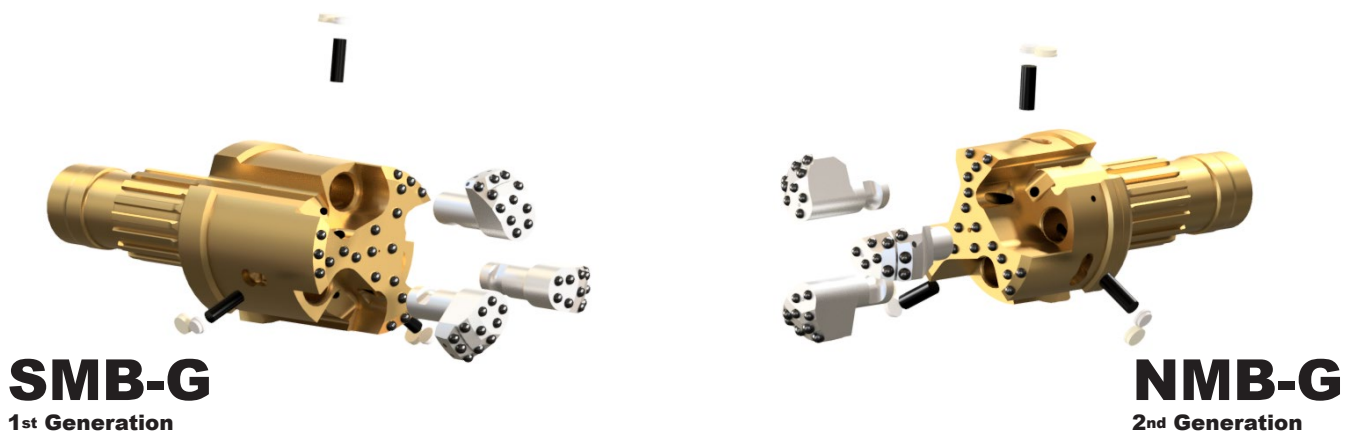
2. Increased shank diameter of wing bit

By increasing the shaft diameter by 40-70%, it is made capable of withstanding higher stress. This reduces shaft breakage in harder ground formations.



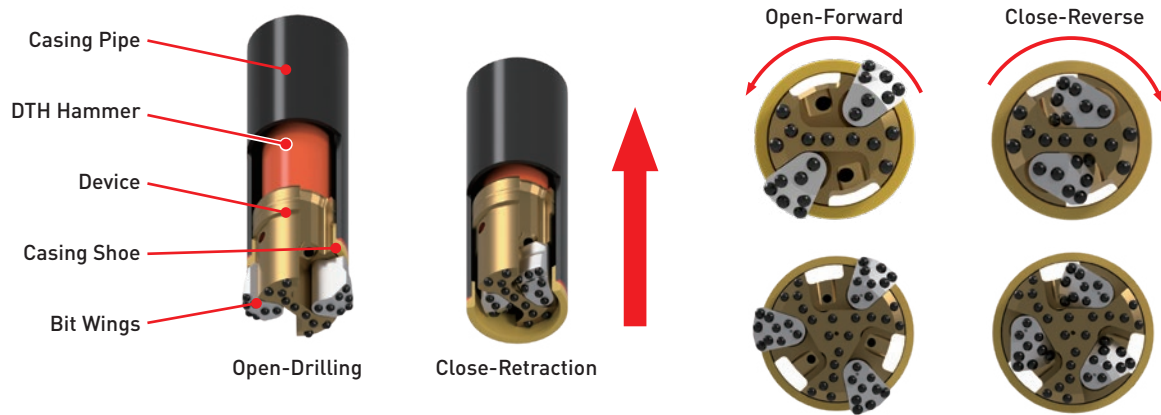
3. Increased retaining pin diameter

By increasing the pin diameter by 35-55%, the replacement interval has been extended, and the risk of pin breakage has been nearly eliminated.



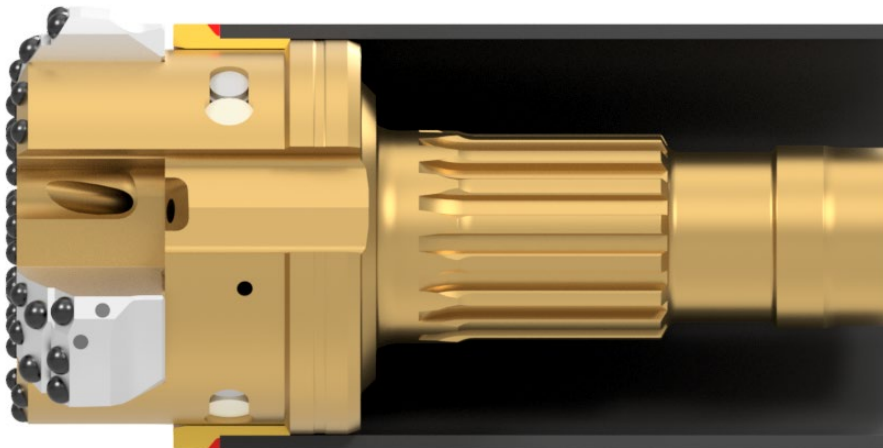
Underreaming mechanism

Wing Expansion and Retraction



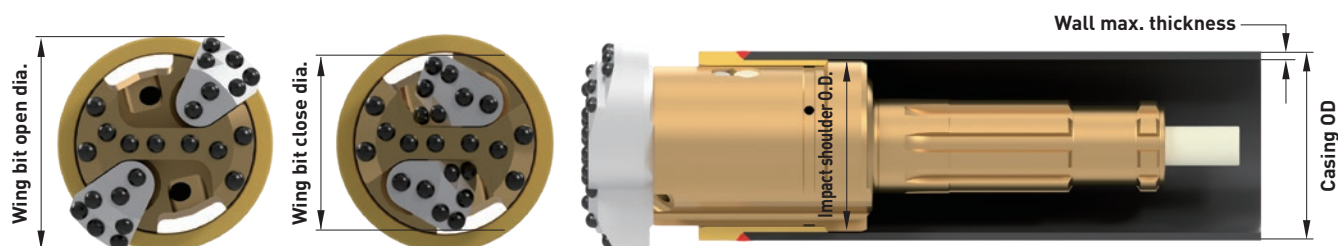
Increasing demand of NMB-G

The **NMB-G** tool is designed to minimize the amount of lost material in the ground, enhancing both **economic efficiency** and **environmental sustainability**. This innovation has led to increased application in **medium-hard to hard rock formations**, where conventional underreamers have traditionally faced challenges. Furthermore, as demand for the installation of **thick-walled steel pipes** continues to grow, ongoing advancements are being made to further optimize its performance.



NEW MAXBIT G-model / NMB-G

2 Wings model



Casing OD		Wall max. thickness		Type	Wing bit open dia.		Wing bit close dia.		Impact shoulder O.D.		Hammer size	Bit shank	System Product code	Wing bit Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch				
114.3	4 1/2"	8.0	0.31"	88	125	4.92"	87	3.43"	97	3.82"	3	DHD3.5	G2DH3.5P88R-120	G2HEADP88R-875
		6.35	0.25"	92	125	4.92"	90	3.54"	100	3.94"	3	DHD3.5	G2DH3.5P92R-121	G2HEADP92R-876
		6.0	0.24"	92	125	4.92"	90	3.54"	100.5	3.96"	3	DHD3.5	G2DH3.5P92R-122	
139.7	5 1/2"	6.6	0.26"	115	152	5.98"	113	4.45"	124.5	4.90"	4	DHD340	G2DH340P115R-056T	G2HEADP115R-790
												QLX40 (TD40, COP44G)	G2QLX40P115R-124	
168.3	6 5/8"	8.0	0.31"	140	185	7.28"	140	5.51"	150.5	5.93"	5	DHD350	G2DH350P140R-125	G2HEADP140R-791
		6.35	0.25"	140	185	7.28"	140	5.51"	153.5	6.04"	5	QL50	G2QL50P140R-126	
												DHD350	G2DH350P140R-105T	
												QL50	G2QL50P140R-057T	
		6.0	0.24"	140	185	7.28"	140	5.51"	154	6.06"	5	DHD350	G2DH350P140R-127	
												QL50	G2QL50P140R-128	

3 Wings model

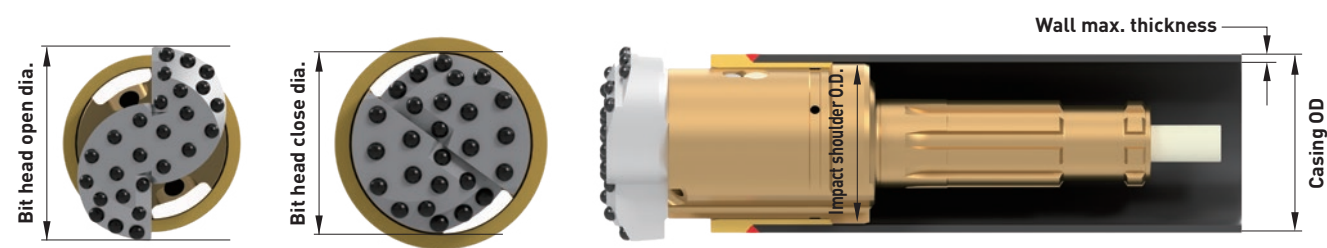


Casing OD		Wall max. thickness		Type	Wing bit open dia.		Wing bit close dia.		Impact shoulder O.D.		Hammer size	Bit shank	System Product code	Wing bit Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch				
219.1	8 5/8"	12.7	0.50"	178	235	9.25"	173	6.81"	191.5	7.54"	6	DHD360	G3DH360P178R-129	G3HEADP178R-880
		6.35	0.25"	187	235	9.25"	185	7.28"	204	8.03"	6	QL60	G3QL60P178R-130	
												DHD360	G3DH360P187R-131	G3HEADP187R-793
												QL60	G3QL60P187R-059T	
273.0	10 3/4"	12.7	0.50"	227	295	11.61"	226	8.90"	245	9.65"	8	DHD380	G3DH380P227R-132	G3HEADP227R-881
		10.0	0.39"	235	295	11.61"	233	9.17"	250	9.84"	8	QL80	G3QL80P227R-133	
												DHD380	G3DH380P235R-134	G3HEADP235R-882
												QL80	G3QL80P235R-135	
		8.0	0.31"	240	295	11.61"	238	9.37"	255	10.04"	8	DHD380	G3DH380P240R-136	G3HEADP240R-795
												QL80	G3QL80P240R-137	

Casing OD		Wall max. thickness		Type	Wing bit open dia.		Wing bit close dia.		Impact shoulder O.D.		Hammer size Inch	Bit shank	System Product code	Wing bit Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch				
323.9	12 3/4"	16.0	0.63"	273	342	13.46"	269	10.59"	289.5	11.40"	10	DHD310	G3DH310P273R-138	G3HEADP283R-796
											SD10	G3SD10P273R-139		
											8	DHD380	G3DH380P273R-140	
											QL80	G3QL80P273R-141		
		12.7	0.50"	277	342	13.46"	269	10.59"	294	11.57"	10	DHD310	G3DH310P277R-142	
											SD10	G3SD10P277R-143		
											8	DHD380	G3DH380P277R-144	
											QL80	G3QL80P277R-145		
		10.0	0.39"	283	342	13.46"	269	10.59"	300	11.81"	10	DHD310	G3DH310P283R-146	
											SD10	G3SD10P283R-147		
											8	DHD380	G3DH380P283R-148	
											QL80	G3QL80P283R-149		
		8.0	0.31"	283	342	13.46"	269	10.59"	304	11.97"	10	DHD310	G3DH310P283R-150	
											SD10	G3SD10P283R-151		
											8	DHD380	G3DH380P283R-152	
											QL80	G3QL80P283R-153		
355.6	14"	12.7	0.50"	306	375	14.76"	303	11.93"	327	12.87"	12	DHD112	G3DH112P306R-154	G3HEADP306R-830
											QL120	G3QL120P306R-155		
											SD12	G3SD12P306R-156		
											DHD310	G3DH310P306R-157		
		9.5	0.37"	317	375	14.76"	314	12.36"	333.5	13.13"	10	SD10	G3SD10P306R-158	G3HEADP317R-883
											DHD112	G3DH112P317R-159		
											QL120	G3QL120P317R-160		
											SD12	G3SD12P317R-161		
8.0	0.31"	317	375	14.76"	314	12.36"	336.5	13.25"	10	DHD310	G3DH310P317R-162			
									SD10	G3SD10P317R-163				
									DHD112	G3DH112P317R-164				
									QL120	G3QL120P317R-165				
8.0	0.31"	317	375	14.76"	314	12.36"	336.5	13.25"	12	SD12	G3SD12P317R-166			
									DHD310	G3DH310P317R-167				
									SD10	G3SD10P317R-168				
									DHD112	G3DH112P356R-169				
406.4	16"	12.7	0.50"	356	438	17.24"	354	13.94"	377	14.84"	12	QL120	G3QL120P356R-170	G3HEADP356R-884
											SD12	G3SD12P356R-171		
											DHD112	G3DH112P365R-172		
		8.0	0.31"	365	438	17.24"	357	14.06"	387	15.24"	12	QL120	G3QL120P365R-173	G3HEADP365R-798
											SD12	G3SD12P365R-174		
											DHD112	G3DH112P455R-175		
508.0	20"	16.0	0.63"	455	530	20.87"	443	17.44"	472	18.58"	18	QL200	G3QL200P455R-175	G3HEADP455R-885
											SD18	G3SD18P455R-176		
											DHD112S	G3DH12SP455R-177		
											SD15S	G3SD15SP455R-178		
		12.7	0.50"	463	530	20.87"	460	18.11"	479	18.86"	18	QL200	G3QL200P463R-179	G3HEADP463R-886
											SD18	G3SD18P463R-180		
											DHD112S	G3DH12SP463R-181		
											SD15S	G3SD15SP463R-182		
609.6	24"	16.0	0.63"	553	630	24.80"	537	21.14"	573	22.56"	18	QL200	G3QL200P553R-183	G3HEADP561R-826
											SD18	G3SD18P553R-184		
		12.7	0.50"	561	630	24.80"	537	21.14"	580	22.83"	18	QL200	G3QL200P561R-185	
											SD18	G3SD18P561R-186		

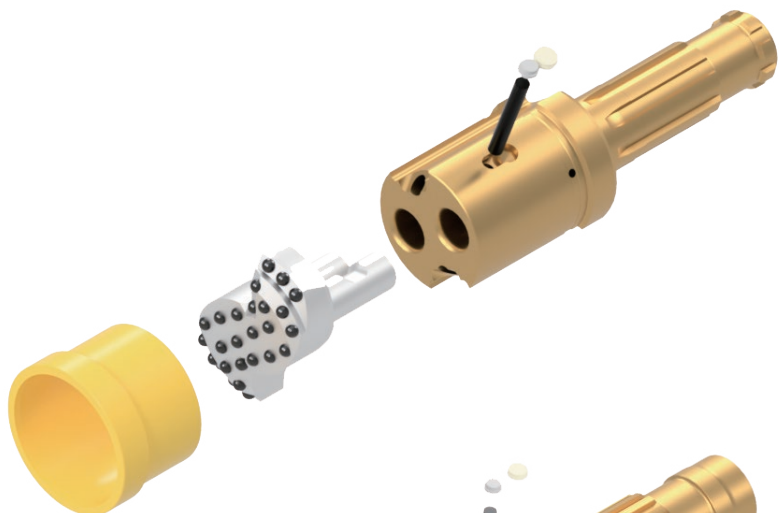
SUPER MAXBIT / SMB

2 Wings model

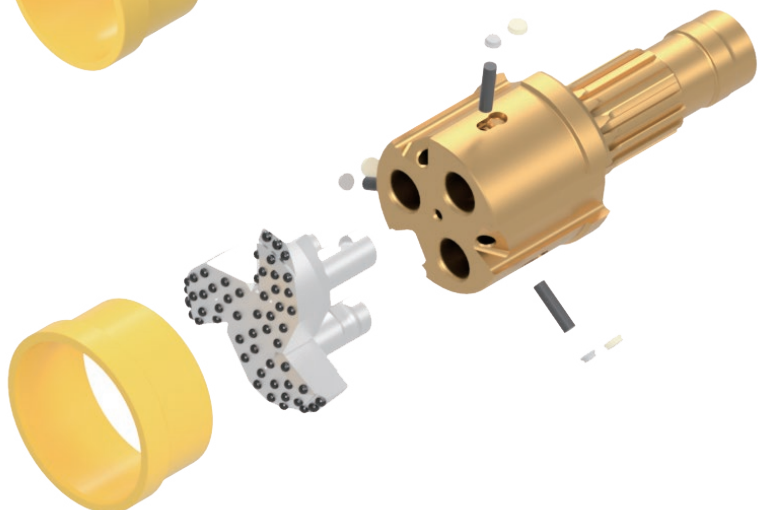


Casing OD		Wall max. thickness		Type	Wing bit open dia.		Wing bit close dia.		Impact shoulder O.D.		Hammer size	Bit shank	System Product code	Wing bit Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch	Inch			
114.3	4 1/2"	6.35	0.25"	90	125	4.92"	91	3.58"	100	3.94"	3	DHD3.5	2DH3.5P90R-869	2HEADP90R-003
		6.0	0.24"	90	125	4.92"	91	3.58"	100.5	3.96"	3	DHD3.5	2DH3.5P90R-565	
139.7	5 1/2"	6.6	0.26"	115	152	5.98"	114.5	4.51"	124.5	4.90"	4	DHD340	2DH340P115R-845	2HEADP115R-005
												QLX40 (TD40, COP44G)	2QLX40P115R-870	
168.3	6 5/8"	8.0	0.31"	140	185	7.28"	140.5	5.53"	150	5.91"	5	DHD350	2DH350P140R-871	2HEADP140R-006
												QL50	2QL50P140R-872	
		6.35	0.25"	140	185	7.28"	140.5	5.53"	154	6.06"	5	DHD350	2DH350P140R-873	
												QL50	2QL50P140R-874	
		6.0	0.24"	140	185	7.28"	140.5	5.53"	154.5	6.08"	5	DHD350	2DH350P140R-875	
												QL50	2QL50P140R-876	
219.1	8 5/8"	12.7	0.50"	176	237	9.33"	174	6.85"	192	7.56"	6	DHD360	2DH360P176R-682	2HEADP176R-583
												QL60	2QL60P176R-877	
		6.35	0.25"	187	237	9.33"	186	7.32"	203	7.99"	6	DHD360	2DH360P187R-878	2HEADP187R-008
												QL60	2QL60P187R-879	

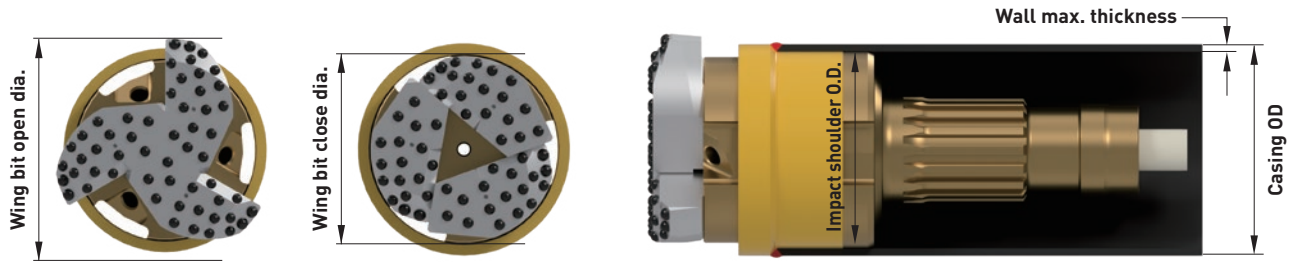
SMB 2 Wings model



SMB 3 Wings model



3 Wings model



Casing OD		Wall max. thickness		Type	Wing bit open dia.		Wing bit close dia.		Impact shoulder O.D.		Hammer size	Bit shank	System Product code	Wing bit Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch				
273.0	10 3/4"	10.0	0.39"	235	290	11.42"	232.5	9.15"	250	9.84"	8	DHD380	3DH380P235R-1181	3HEADP235R-127
												QL80	3QL80P235R-1182	
		8.0	0.31"	240	290	11.42"	232.5	9.15"	255	10.04"	8	DHD380	3DH380P240R-1183	
												QL80	3QL80P240R-1184	
323.9	12 3/4"	12.7	0.50"	280	340	13.39"	281.5	11.08"	296	11.65"	10	DHD310	3DH310P280R-1185	3HEADP280R-018
												SD10	3SD10P280R-603	
											8	DHD380	3DH380P280R-601	
												QL80	3QL80P280R-1186	
		10.0	0.39"	280	340	13.39"	281.5	11.08"	300	11.81"	10	DHD310	3DH310P280R-1187	
												SD10	3SD10P280R-1188	
											8	DHD380	3DH380P280R-1189	
												QL80	3QL80P280R-1190	
		8.0	0.31"	280	340	13.39"	281.5	11.08"	300	11.81"	10	DHD310	3DH310P280R-1191	
												SD10	3SD10P280R-1192	
											8	DHD380	3DH380P280R-1193	
												QL80	3QL80P280R-1194	
355.6	14"	12.7	0.50"	312	373	14.69"	310	12.20"	328	12.91"	12	DHD112	3DH112P312R-1195	3HEADP312R-533
												QL120	3QL120P312R-1196	
											10	SD12	3SD12P312R-631	
												DHD310	3DH310P312R-1197	
		9.5	0.37"	315	373	14.69"	314	12.36"	333.5	13.13"	12	SD10	3SD10P312R-1198	3HEADP315R-125
												DHD112	3DH112P315R-602	
											10	QL120	3QL120P315R-1199	
												SD12	3SD12P315R-574	
		8.0	0.31"	315	373	14.69"	314	12.36"	336.5	13.25"	12	DHD310	3DH310P315R-1200	
												SD10	3SD10P315R-1201	
											10	DHD112	3DH112P315R-1202	
												QL120	3QL120P315R-1203	
406.4	16"	12.7	0.50"	362	425	16.73"	360	14.17"	378.5	14.90"	12	SD12	3SD12P362R-633	3HEADP362R-331
												DHD112	3DH112P365R-1209	
											12	QL120	3QL120P365R-1210	
												SD12	3SD12P365R-1211	
		8.0	0.31"	365	425	16.73"	363	14.29"	387.5	15.26"	12	DHD112	3DH112P365R-1209	3HEADP365R-020
												QL120	3QL120P365R-1210	
												SD12	3SD12P365R-1211	
												DHD112	3DH112P365R-1209	
508.0	20"	16.0	0.63"	456	530	20.87"	454	17.87"	473	18.62"	18	QL200	3QL200P456R-1212	3HEADP456R-861
												SD18	3SD18P456R-1213	
											15	DHD112S	3DH12SP456R-1214	
												SD15S	3SD15SP456R-1215	
		12.7	0.50"	460	530	20.87"	461	18.15"	479	18.86"	18	QL200	3QL200P460R-1216	3HEADP460R-022
												SD18	3SD18P460R-1217	
											15	DHD112S	3DH12SP460R-742	
												SD15S	3SD15SP460R-604	
609.6	24"	16.0	0.63"	550	630	24.80"	548	21.57"	573	22.56"	18	QL200	3QL200P550R-1218	3HEADP550R-874
												SD18	3SD18P550R-1219	
		12.7	0.50"	560	630	24.80"	559	22.01"	580	22.83"	18	QL200	3QL200P560R-1220	3HEADP560R-024
												SD18	3SD18P560R-605	

SUPER MAXBIT E-model / SMB-E



Casing OD		Wall max. thickness		Type	Bit head open dia.		Bit head close dia.		Pilot bit Impact shoulder O.D.		Hammer size	Bit shank	System Product code	Bit head Product code
mm	Inch	mm	Inch		mm	Inch	mm	Inch	mm	Inch				
114.3	4 1/2"	6.0	0.24"	90	125	4.92"	90	3.54"	100.5	3.96"	3	DH3.5	EDH3.5P90R-132	EHEADP90R-297
139.7	5 1/2"	6.6	0.26"	115	152	5.98"	114.5	4.51"	124.5	4.90"	4	DH340	EDH340P115R-082	EHEADP115R-268
												QLX40 (TD40, COP44G)	EQLX40115R-131	
168.3	6 5/8"	6.35	0.25"	140	185	7.28"	140	5.51"	154	6.06"	5	DH350	EDH350P140R-110	EHEADP140R-259
												QL50	EQL50P140R-109	
219.1	8 5/8"	6.35	0.25"	187	237	9.33"	186	7.32"	203	7.99"	6	DH360	EDH360P187R-114	EHEADP187R-272
												QL60	EQL60P187R-113	
273.1	10 3/4"	6.35	0.25"	235	310	12.20"	232	9.13"	252	9.92"	8	DH380	EDH380P235R-116	EHEADP235R-685
												QL80	EQL80P235R-115	

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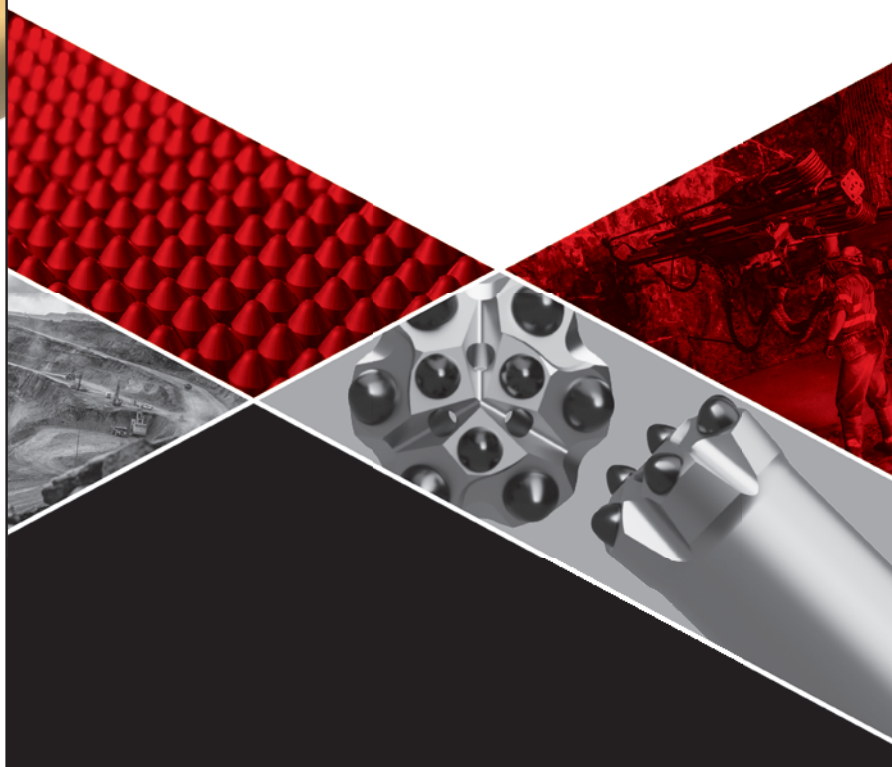


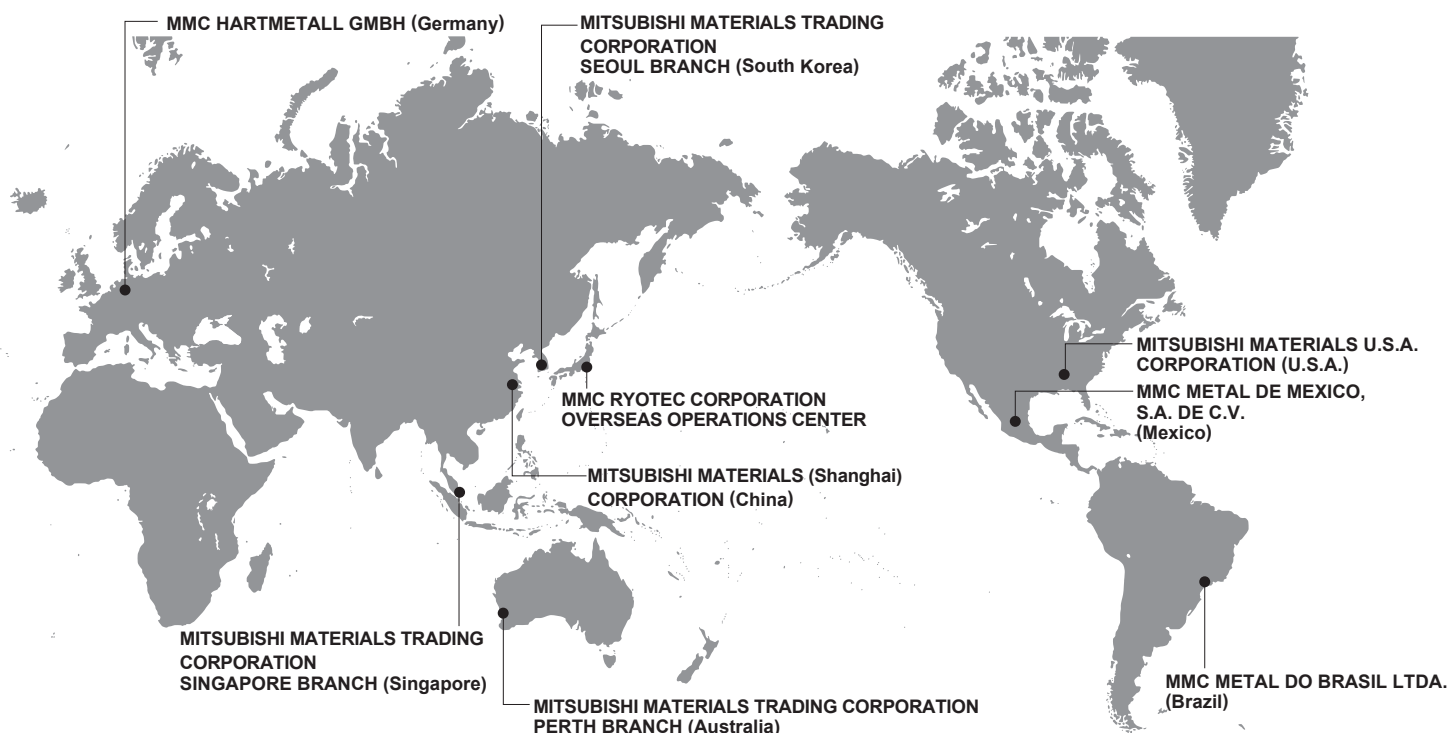
MMC RYOTEC Corporation
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Jun-2024 Update RT01-E-2

TOP HAMMER TOOLS

ADVANCED MANUFACTURING METHODS FOR CONSISTENTLY HIGHER QUALITY





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