

DIA  **EDGE**

RT01D

ROCK TOOLS

ADVANCED MANUFACTURING METHODS FOR CONSISTENTLY HIGHER QUALITY



 **MITSUBISHI MATERIALS**



MITSUBISHI MATERIALS

Mitsubishi Materials Corporation has been developing percussion rock drilling tools for over 60 years in Japan. Mitsubishi is truly a worldwide player and is offering high quality products to the global market. Currently Mitsubishi is supplying over 50 countries and continues to increase the number of sales districts.

Mitsubishi Rock Tools products are manufactured from highly wear resistant steel and our own in house Japanese produced Mitsubishi carbide inserts. These carbide inserts are designed and produced by experienced engineers using the most advanced computer technology. Using this new computer technology, these carbide inserts are combined with the special steel bodies developed by Mitsubishi to provide the client with unbeatable consistent quality. What is more, each bit body is marked with a manufacturing lot number that allows precise tracking and control through the full history of the manufacturing process of carbide inserts and steel bodies. Mitsubishi has been a leader in helping to achieve remarkable technological innovations that have propelled the mining, construction and quarry industries to the highest drilling efficiencies. State-of-the-art technology in Mitsubishi Rock Tools have kept pace with the new breed

of hydraulic drilling machines. Incorporating our products with these new drilling machines has resulted in additional labor savings, greater efficiencies, and safety for the clients. In order to allow the new drills to display their maximum capacities and efficiencies, Mitsubishi Rock Tools products undergo refined laboratory studies and are put in extensive field experiments in every conceivable rock drilling condition. Testing of Mitsubishi Rock Tools products in the field is done by qualified engineers who report in detail the findings to the client's management, and these test results are used to determine the correct products for the best overall drilling economy. Mitsubishi is constantly striving to improve rock drilling excellence and continues to research new Mitsubishi Rock Tools products and develop new technology to lower drilling costs. We produce for you a product which is the most consistent, highest quality drilling tool manufactured in the world today. At Mitsubishi we believe that the Mitsubishi Rock Tools products we produce will meet your every request and give you the best possible drilling economy to make your operation more profitable. Please contact Mitsubishi Materials and get in contact with your nearest representative to start lowering your drilling costs today.

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Chosen by drillers every where!

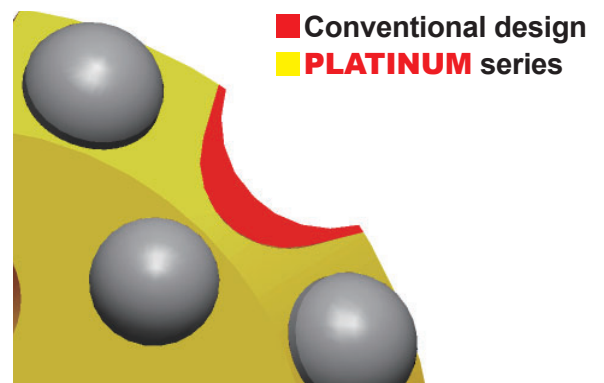


MITSUBISHI ROCK TOOLS **PLATINUM**

Mitsubishi Materials Corporation is proud to introduce MITSUBISHI ROCK TOOLS **PLATINUM series! Our new **PLATINUM** series designs are the most innovated designs available. The goal of **PLATINUM** series is to offer faster drilling, more wear resistant and extended tool life.**

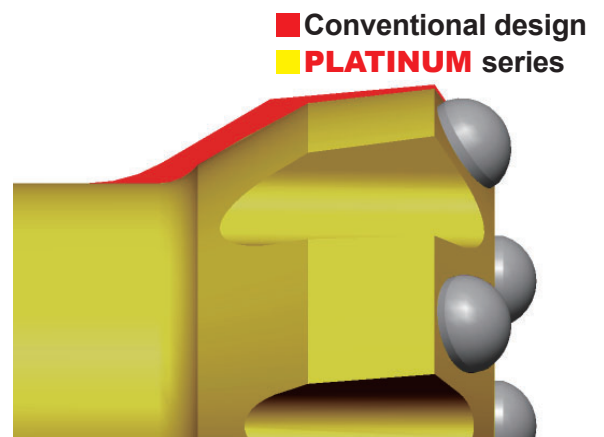
FLUSHING GROOVE:

- Designed to remove cuttings more efficiently
- Deeper and larger grooves provide smooth flushing and removes material faster
- Provides longer tool life



LATERAL BIT HEAD:

- Designed the lateral section of the bit head
- Increased clearance angle and shortened bit head to offer highest penetration rate
- Reduces drilling time



BUTTON CONFIGURATIONS:

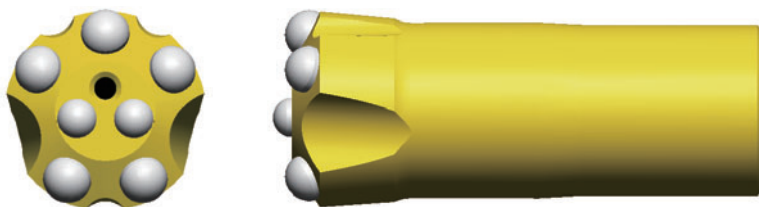
- Design of button layout and location
- Optimized rock breakage with each turn of the bit
- Offers longer tool life

TUNGSTEN CARBIDE:

- Continuous improvements and new tungsten carbide grades
- For a variety of ground conditions, we offer a variety of tungsten carbide grades and shapes

THREADED BIT

Drifting & Tunnelling equipment

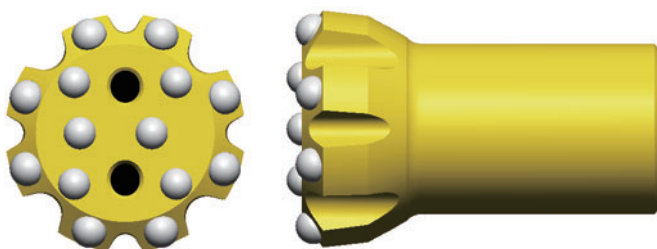


32RT P V S 45 R 06 M

- Gauge angle (**L**: 30°, **M**: 35°, **H**: 40°)
- Face design (Refer to page.14)
- Carbide shape (**R**: Round, **BB**: Semi-ballistic, **B**: Ballistic, **SA**: Spike)
- Gauge diameter(mm)
- Skirt type (**S**: Straight skirt, **R**: Retractor skirt)
- Flushing hole type (**V**: Face flushing, **W**: Face + Side flushing, **J**: Face + Reverse flushing)
- Bit type (**P**: Button type, **C**: Cross type)
- Thread type (**25RT**: R25, **28RT**: R28, **32RT**: R32, **34NR**: NR34, **35RT**: R35)

THREADED BIT

Bench & Long hole drilling equipment



38M P V S 64 R 15 M

- Gauge angle (**L**: 30°, **M**: 35°, **H**: 40°)
- Face design (Refer to page.16)
- Carbide shape (**R**: Round, **BB**: Semi-ballistic, **B**: Ballistic, **SA**: Spike)
- Gauge diameter(mm)
- Skirt type (**S**: Straight skirt, **R**: Retractor skirt)
- Flushing hole type (**V**: Face flushing, **W**: Face + Side flushing, **J**: Face + Reverse flushing)
- Bit type (**P**: Button type, **X**: Cross type)
- Thread type (**38M**: T38, **45M**: T45, **51M**: T51, **58WD**: ST58, **68WD**: ST68)

DRIFTING ROD



E H32 M38 R32 - 4310

Total length (mm)

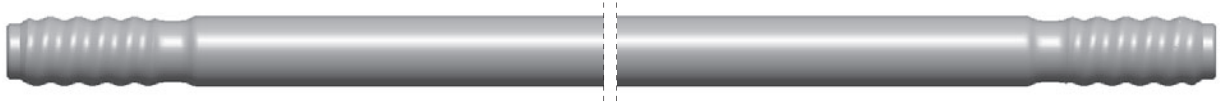
Thread type (**R32**: 32RT on bit end)

Thread type (**M38**: T38 on shank end)

Rod section (**H32**: Hex 32mm (1 1/4"), **H25**: Hex 25mm (1"), **H28**: Hex 28mm (1 1/8"), **H35**: Hex 35mm (1 3/8"))

E: Extension rod

EXTENSION ROD



E R38 M38 - 3050

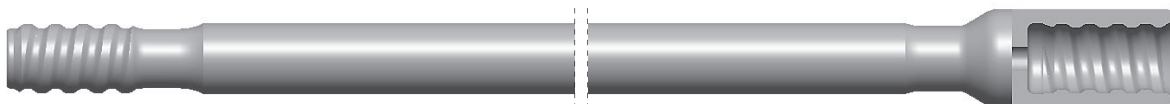
Total length (mm)

Thread type (**M38**: T38 on each end)

Rod section (**R38**: Round ø38mm (1 1/2"))

E: Extension rod

MALE / FEMALE ROD



E R45 M45 MF - 3660

Length (mm)

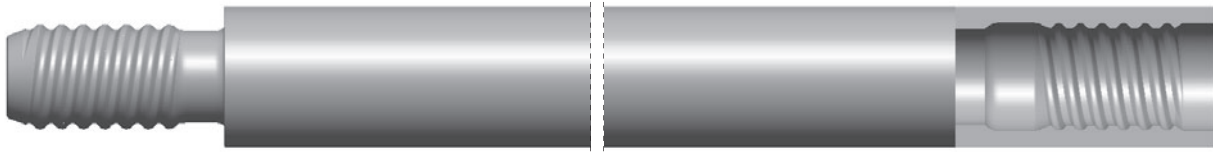
MF: Male / Female thread rod

Thread type (**M45**: T45 on each end)

Rod section (**R45**: Round ø45mm (1 3/4"))

E: Extension rod

DRILL TUBE



G R87 WD68 MF - 1830

Length (mm)

MF: Male / Female thread rod

Thread type (**WD68:** ST68 thread on each end)

Rod section (**R87:** Round ø87mm (3 2/5"))

G: Drill tube

SHANK ADAPTER



S142 M38 SF B

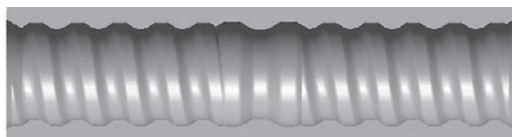
Total length (Serial Number)

SF: Separate flushing , Alphabet code: Flushing tube type

Thread type (**M38:** 38mm (1 1/2") T thread)

Drifer model (Serial number)

COUPLING SLEEVE

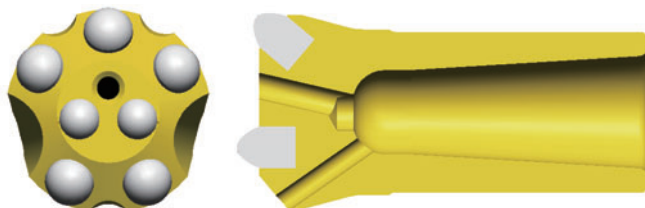


C M38

Thread type (**M38:** 38mm (1 1/2") T thread)

C : Coupling sleeve

TAPERED BIT



T 22 P 32 C BB 06

- T: Tapered bit
- 22 : Inner diameter of bit skirt 22mm (7/8")
- Bit type (**P**: Button type, **C**: Cross type, **I**: Chisel type)
- Gauge diameter(mm)
- **C** : Taper angle (Refer to page.21)
- Carbide shape (**R**: Round, **BB**: Semi-ballistic, **SA**: Spike)
- Face design (**06**: 7 buttons, **03**: 9 buttons)

TAPERED ROD



T H22 L 09 C

- T : Tapered rod
- Rod section (**H22**: Hex 22mm (7/8"), **H25**: Hex 25mm (1"))
- Shank length (**L**: 108mm (Long shank))
- Effective length (**09**: 0.9m)
- **C** : Taper angle (Refer to page.21)

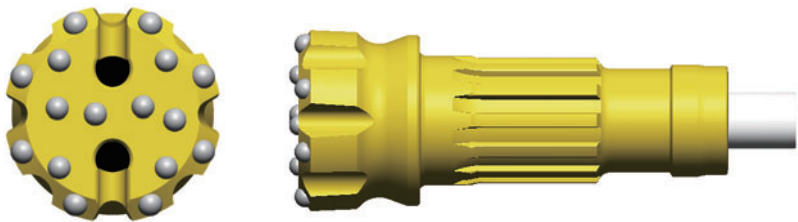
INTEGRAL DRILL STEEL



I H22 L 39 18

- I: Integral drill steel
- Rod section (**H22**: Hex 22mm (7/8"), **H25**: Hex 25mm (1"))
- Shank length (**L**: 108mm (Long shank))
- Bit diameter(mm)
- Effective length (**18**: 1.8m)

DOWN THE HOLE BIT



DH360 P 165 R 2 5

DH360	P	165	R	2	5
Hammer model	Bit type (P: Button type)	Gauge diameter (mm)	Carbide shape (R: Round, BB: Semi-ballistic, SA: Spike)	Face design (2: Flat face, 6: Concave, 8: Convex)	5: Heavy-duty carbide type, 1: Light-duty carbide type

Mitsubishi Carbide

Carbide tools

Manufacturing supports modern civilization by machining iron, cement, copper, glass, plastics and various other materials. Carbide tools are one of the major tools used in this machining. These tools are made from cemented carbide, which combines tungsten carbide (WC) and cobalt (Co). Carbide tools have three main applications;

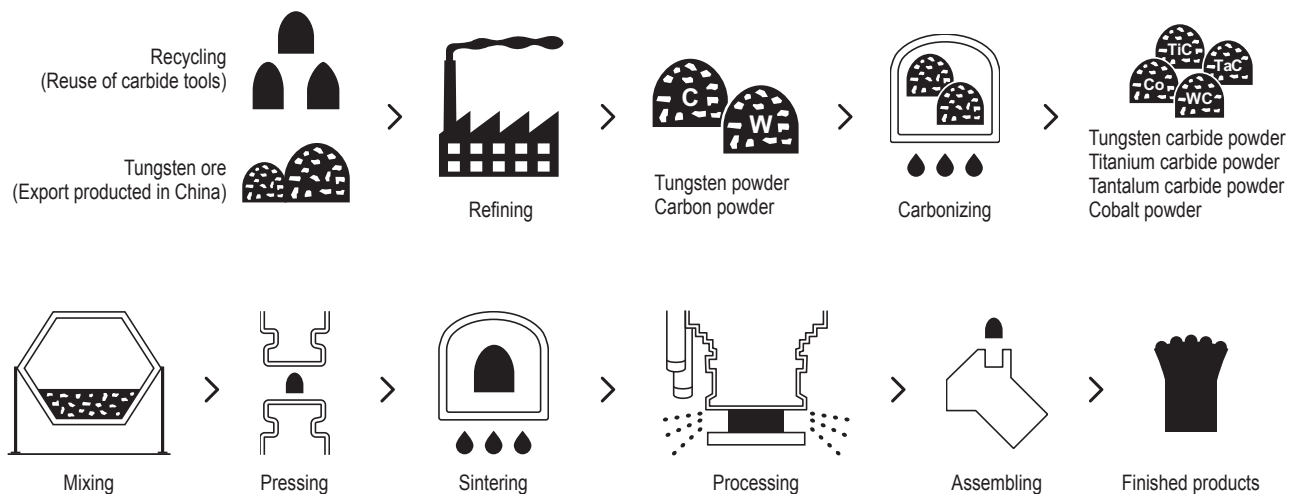
- 1) rock drilling tools, essential for mine excavations and infrastructural development for tunnels and roads, and
- 2) cutting tools for automotive and aerospace machining applications;
- 3) wear resistant tools used as molds for sanitary goods manufacturing, rolls for metal rolling, coating tools for LCD television displays and more.

History

1947: Established Rock Tools plant for integral drill steels, tapered bits and tapered rods
1948: Began to sell to Japanese mines
1956: Began to receive inquiries from Asian Customers
1963: Started exporting our products all over the world
Started manufacturing threaded button bits
1983: Button bits became our main product
1992: Developed Super Max Bit system
1996: Developed Super Max Bit E-system
2003: Developed Super Max Bit G-system
2006: Developed Ultra Max Bit

Manufacturing system

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

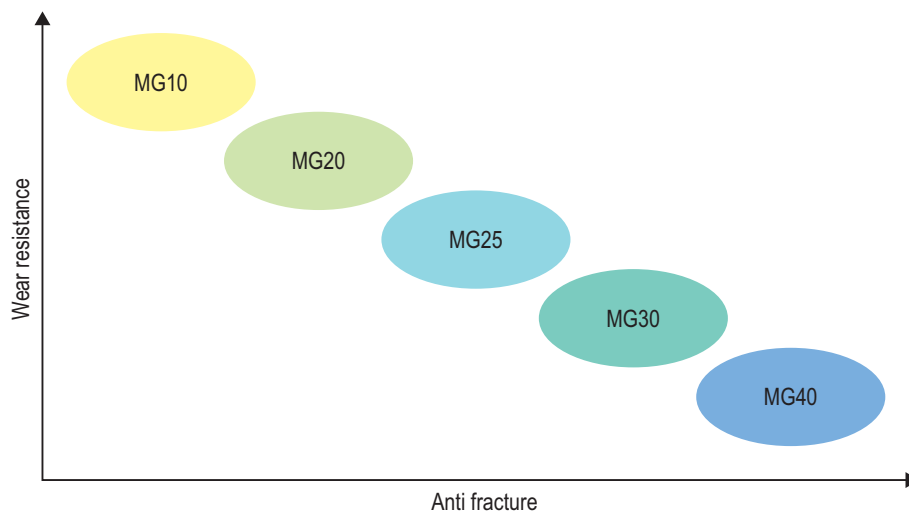


Bits application guide

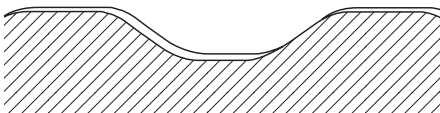
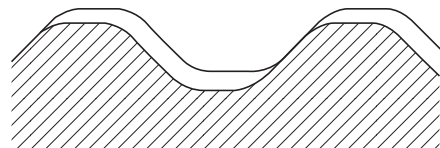
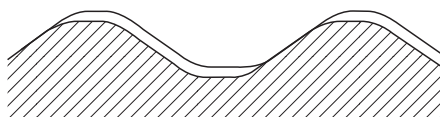
Standard Carbide Grade

Mitsubishi carbide grade	Suitable tools	Rock hardness	Uniaxial compressive strength of rock [MPa]
MG10	Threaded button bit	Extremely hard	200 -
MG20	Threaded button bit, Tapered button bit, DTH bit	Medium-hard to Hard	100 - 200
MG25*	Threaded button bit, Tapered button bit	Medium-hard	80 - 150
MG30	Tapered button bit, Threaded cross bit	Medium-hard	80 - 120
MG40	Threaded cross bit	Soft to Medium-hard	- 100

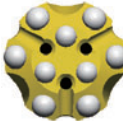
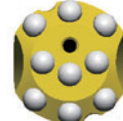
* Carbide grade "M2" is equivalent to "MG25"

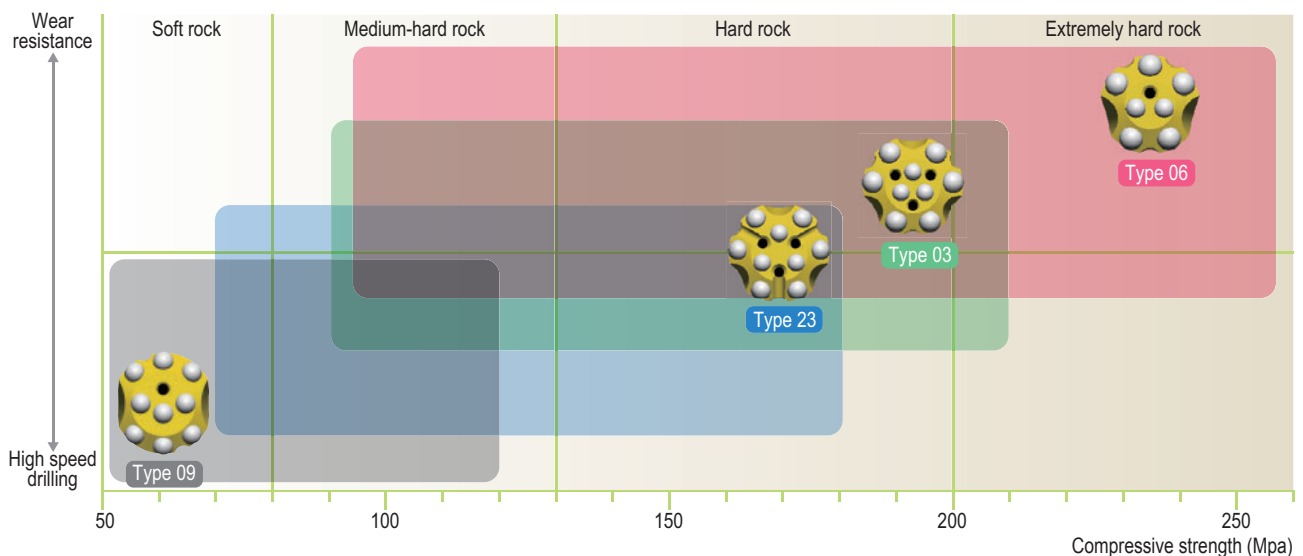


Mitsubishi Thread Compatibility

Thread form	Thread type	Mitsubishi thread
Rope thread 	R25	R25
	R28	R28
	R32	R32
	R35	R35
	R38	R38
T thread (M thread) 	T38	M38
	T45	M45
	T51	M51
ST thread (WD thread)  	ST58	WD58
	ST68	WD68

Selection guide

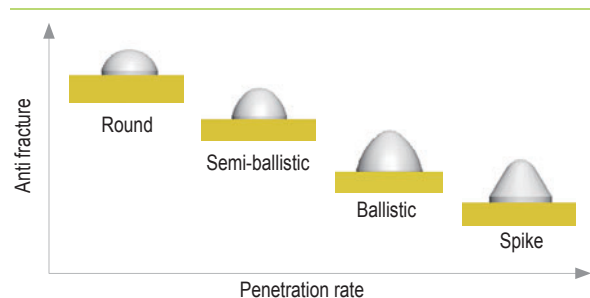
Type		Type 06	Type 03	Type 23	Type 09	Type 08	Cross
Face configuration							
Rock hardness	Hard	⊙	○				
	Medium-hard	○	⊙	⊙	○		○
	Soft			○	⊙	⊙	○
Character	High speed drilling		○	○	⊙	⊙	
	Wear resistance	⊙	○				
	Straightness						○
		Wear resistant bit for medium-hard to hard rock formations.	High speed drilling bit for medium-hard to hard rock formations.	Wear resistant bit for soft to medium-hard rock formations.	High speed drilling bit for soft to medium-hard rock formations.	High speed drilling bit for soft rock formations. * Advantage for face buttons regrinding.	Straightest drilling bit. *Low speed drilling.



Carbide shape variety

R : Round	BB : Semi ballistic	B : Ballistic	SA : Spike
			
Utility carbide shape. Strong configuration against carbide fracture.	Combined wear resistance and high penetration rate. Recommended for medium-hard rock with moderate abrasivity.	Higher penetrating carbide shape than Semi ballistic shape. Recommended for soft rock.	Highest penetrating carbide shape. *Weak configuration against carbide fracture. Recommended for soft to medium-hard rock.

Carbide feature



Flushing hole variety

V : Face flushing hole	W : Face and side flushing hole
 Normal flushing hole design.	 Effective in case of plugged face flushing hole.

Skirt variety

S : Straight skirt	R : Retrac skirt (R32 thread bitØ51 or larger)
 Normal bit skirt design.	 Retrac wings help to guide the bit in and out of the hole. Effective in straight hole drilling.

Drifting & Tunnelling equipment FAQ

Customer's request	Recommendation	
1. Hard rock drilling	Type 06	
	Type 03	
	Round button	
2. Soft rock drilling	Type 08	
	Type 09	
	Type 23	
	Semi-ballistic button	
	Spike button	
3. Improvement of penetration rate	Type 09	
	Type 23	
	Semi-ballistic button	
	Spike button	

Customer's request	Recommendation	
4. Resistant to abrasive rock	Type 06	
	Type 03	
	Round button	
5. Anti carbide fracture	Type 06	
	Round button	
6. Against deviation	Cross bit	
	Retrac skirt	
7. Flushing hole plugged	Side flushing hole	

Selection guide

For Bench & Long hole drilling bits (T38, T45, T51, ST58, ST68)

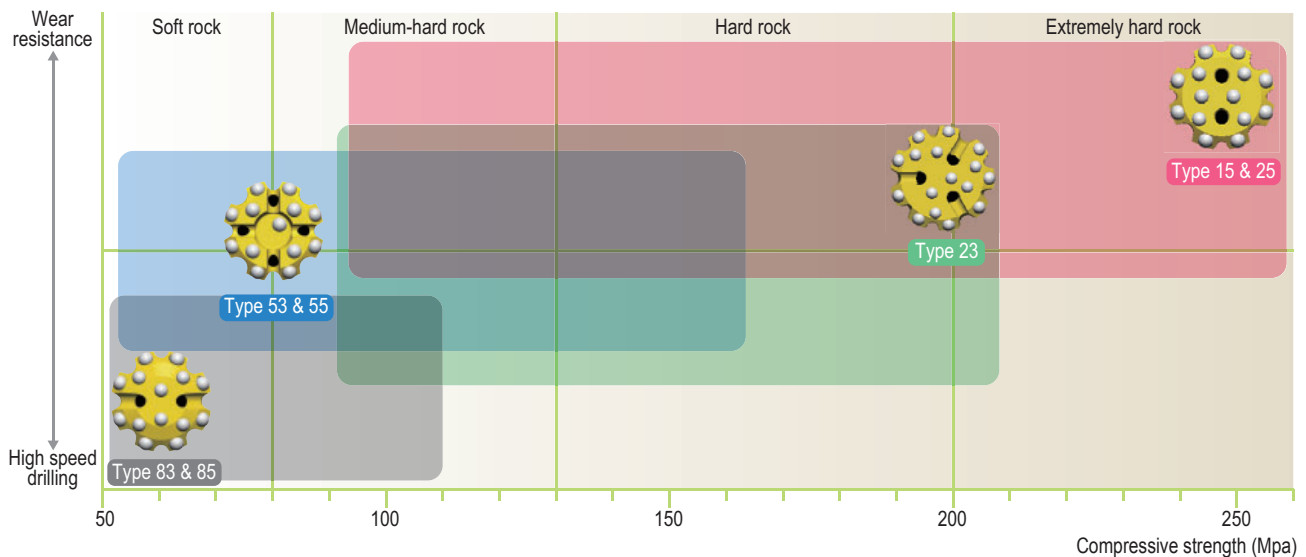
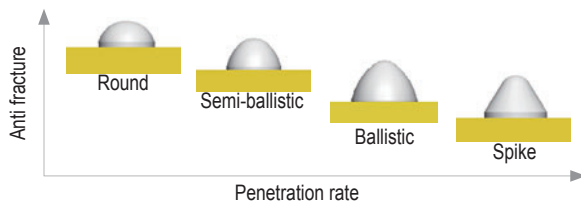
Type		Type 15 & Type 25	Type 23	Type 53 & 55	Type 83 & 85
Face configuration					
Rock hardness	Hard				
	Medium-hard				
	Soft				
Character	High speed drilling				
	Wear resistance				
	Straightness				
		Wear resistant bit for medium-hard to hard rock formations. Type 25 is recommended for large sized bits.		High speed drilling bit for medium-hard rock formations. Recommended to eliminate hole deviation.	
				High speed drilling bit for soft rock formations.	

Type		Type 14	Cross
Face configuration			
Rock hardness	Hard		
	Medium-hard		
	Soft		
Character	High speed drilling		
	Wear resistance		
	Straightness		
		Dedicated to low power drifter.	
		Straightest drilling bit. *Low speed drilling.	

Carbide shape variety

R : Round	BB : Semi ballistic	B : Ballistic	SA : Spike
Utility carbide shape. Strong configuration against carbide fracture.	Combined wear resistance and high penetration rate. Recommended for medium-hard rock with moderate abrasivity.	Higher penetrating carbide shape than Semi ballistic shape. Recommended for soft rock.	Highest penetrating carbide shape. *Weak configuration against carbide fracture. Recommended for soft to medium-hard rock.

Carbide feature



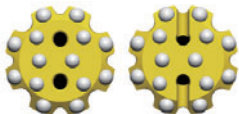
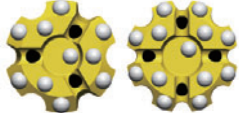
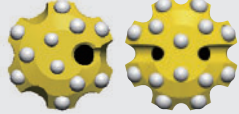
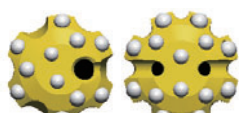
Flushing hole variety

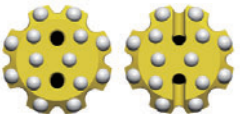
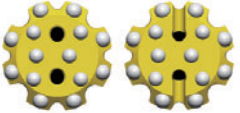
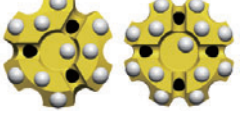
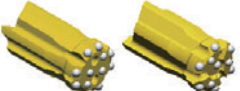
V : Face flushing hole	W : Face and side flushing hole
Normal flushing hole design.	Offers optimized flushing against plugging.

Skirt variety

S : Straight skirt	R : Retractor skirt
Normal bit skirt design.	Retractor wings help to guide the bit in and out of the hole. Effective in straight hole drilling.

Bench & Long hole drilling equipment FAQ

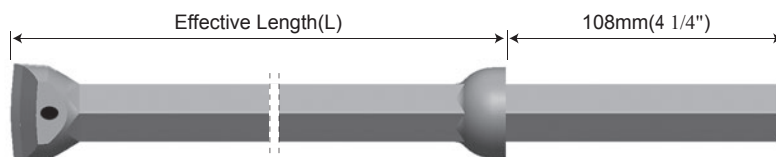
Customer's request	Recommendation	
1. Hard rock drilling	Type 15 , 25	
	Round button	
2. Soft rock drilling	Type 53 , 55	
	Type 83 , 85	
	Semi-ballistic button	
	Spike button	
3. Low power drifter	Type 14	
4. Improvement of penetration rate	Type 23	
	Type 83 , 85	
	Semi-ballistic button	
	Spike button	

Customer's request	Recommendation	
5. Resistant to abrasive rock	Type 15 , 25	
	Round button	
6. Anti carbide fracture	Type 15 , 25	
	Round button	
7. Against deviation	Type 53 , 55	
	Cross bit	
	Retrac skirt	
8. Flushing hole plugged	Side flushing hole	
9. Smooth flushing	Type 25	
	Type 23	

INTEGRAL DRILL STEEL & TAPERED EQUIPMENT



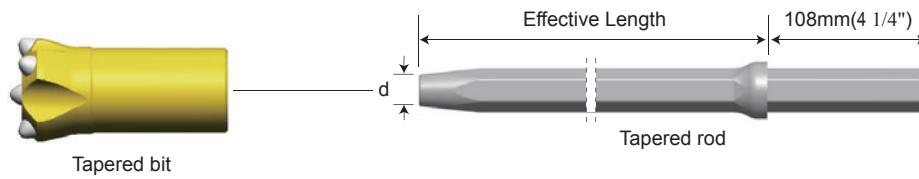
INTEGRAL EQUIPMENT



Shank hex		Rod hex		Shank length		Effective Length(L)		Gauge diameter		Weight [Kg]	Part number
[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[ft/in]	[mm]	[in]		
22	7/8"	22	7/8"	108	4 1/4"	600	2'	35	1 3/8"	3.2	IH22L3506
						600	2'	41	1 5/8"	3.2	IH22L4106
						800	2' 7 1/2"	34	1 11/32"	4	IH22L3408
						800	2' 7 1/2"	40	1 9/16"	4	IH22L4008
						1200	4'	34	1 11/32"	5.7	IH22L3412
						1200	4'	40	1 9/16"	5.7	IH22L4012
						1600	5' 4"	39	1 17/32"	7.3	IH22L3916
						1800	6'	33	1 5/16"	8.2	IH22L3318
						1800	6'	39	1 17/32"	8.2	IH22L3918
						2400	8'	32	1 1/4"	10.7	IH22L3224
						2400	8'	38	1 1/2"	10.7	IH22L3824
						3200	10' 6"	31	1 7/32"	14	IH22L3132
						3200	10' 6"	37	1 15/32"	14	IH22L3732
						4000	13' 1 1/2"	36	1 13/32"	17.4	IH22L3640
						4800	16'	35	1 3/8"	20.7	IH22L3548
						5600	18' 4 1/2"	34	1 11/32"	24.1	IH22L3456

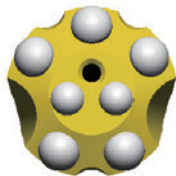
TAPERED EQUIPMENT

Hex22 SERIES



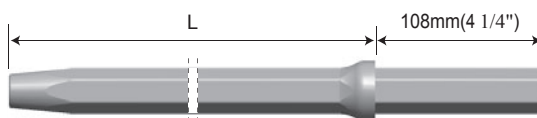
Hex	Taper angle	Rod point dia. (d)	Type	Taper style
22	7°	16	T22F	Long Skirt
22	11°	17.7	T22G	Short Skirt
22	12°	15.2	T22C	Long Skirt
25	7°	19.6	T25B	Long Skirt
25	7°	21.2	T25F	Short Skirt

Hex22 7° tapered bit for long skirt



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
30	1 3/16"	35	5×7	2×6	2	1	0.3	T22P30FBB06
31	1 7/32"	35	5×7	2×6	2	1	0.3	T22P31FBB06
32	1 1/4"	35	5×7	2×7	1	1	0.3	T22P32FBB065
33	1 5/16"	35	5×7	2×7	1	1	0.4	T22P33FBB065
34	1 11/32"	35	5×7	2×7	1	1	0.4	T22P34FBB065
35	1 3/8"	35	5×8	2×8	2	1	0.4	T22P35FBB065
38	1 1/2"	40	5×8	2×8	1	1	0.5	T22P38FBB065Z
40	1 9/16"	40	5×9	2×8	1	1	0.6	T22P40FBB065Z
41	1 5/8"	40	5×9	2×8	1	1	0.6	T22P41FBB065Z

Hex22 7° tapered rod for long skirt

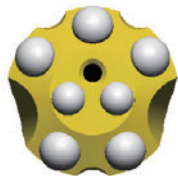


Effective Length(L)		Weight [Kg]	Part number
[mm]	[ft/in]		
900	3'	3.4	TH22L09F
1800	6'	6.4	TH22L18F
3000	10'	10.4	TH22L30F

TAPERED EQUIPMENT

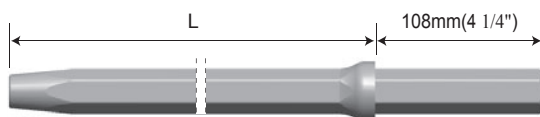
Hex22 SERIES

Hex22 11° tapered bit for short skirt



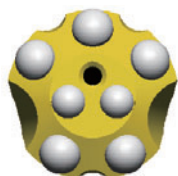
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
32	1 1/4"	35	5×7	2×7	1	1	0.3	T22P32GBB065
33	1 5/16"	40	5×7	2×7	1	1	0.4	T22P33GBB065Z
35	1 3/8"	40	5×7	2×7	1	1	0.4	T22P35GBB065Z1
36	1 13/32"	40	5×8	2×7	1	1	0.5	T22P36GBB065Z2
38	1 1/2"	40	5×9	2×7	1	1	0.5	T22P38GBB065Z2
40	1 9/16"	40	5×9	2×8	1	1	0.6	T22P40GBB065Z1
41	1 5/8"	40	5×9	2×8	1	1	0.6	T22P41GBB065Z3

Hex22 11° tapered rod for short skirt



Effective Length(L)		Weight [Kg]	Part number
[mm]	[ft/in]		
600	2'	2.4	TH22L06G
1000	3' 4"	3.7	TH22L10G
1200	4'	4.4	TH22L12G
1500	5'	5.4	TH22L15G
1600	5' 4"	5.7	TH22L16G
1800	6'	6.4	TH22L18G
2000	6' 6 3/4"	7.1	TH22L20G
2400	8'	8.4	TH22L24G
3000	10'	10.4	TH22L30G

Hex22 12° tapered bit for long skirt



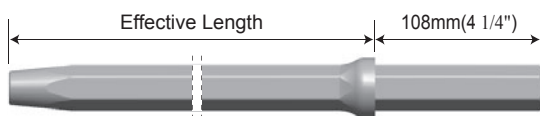
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
32	1 1/4"	35	5×7	2×7	1	1	0.3	T22P32CBB065
33	1 5/16"	35	5×7	2×7	1	1	0.4	T22P33CBB065
35	1 3/8"	35	5×8	2×8	1	1	0.4	T22P35CBB065
38	1 1/2"	35	5×8	2×8	1	1	0.5	T22P38CBB065

Hex22 12° tapered bit for long skirt



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
32	1 1/4"	40	6×7	2×7	1	2	0.3	T22P32CBB084
33	1 5/16"	40	6×7	2×7	1	2	0.4	T22P33CBB084
35	1 3/8"	40	6×8	2×7	2	2	0.4	T22P35CBB084
38	1 1/2"	30	6×8	2×7	1	2	0.5	T22P38CBB08Z

Hex22 12° tapered rod for long skirt



Effective Length(L)		Weight [Kg]	Part number
[mm]	[ft/in]		
500	1' 7 5/8"	2	TH22L05C
1800	6'	6.4	TH22L18C
2200	7' 4"	7.7	TH22L22C
2400	8'	8.4	TH22L24C
2600	8' 6"	9.1	TH22L26C
2900	9' 6 1/8"	10.1	TH22L29C
3900	13'	13.4	TH22L39C
4500	15'	15.4	TH22L45C
5400	18'	18.5	TH22L54C
6300	21'	21.5	TH22L63C

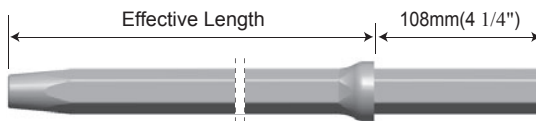
Hex25 SERIES

Hex25 7° tapered bit long skirt



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
41	1 5/8"	40	5×9	2×8	2	1	0.6	T25P41BBB065Z
43	1 11/16"	40	5×9	2×9	2	1	0.6	T25P43BBB06Z

Hex25 7° tapered rod for long skirt



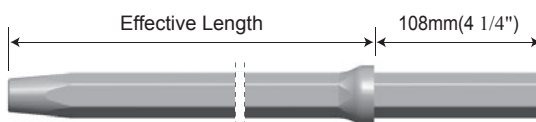
Effective Length(L)		Weight [Kg]	Part number
[mm]	[ft/in]		
1800	6'	8.2	TH25L18B
2200	7' 4"	9.9	TH25L22B
2400	8'	10.7	TH25L24B
2600	8' 6"	11.6	TH25L26B

Hex25 7° tapered bit short skirt



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
41	1 5/8"	40	5×9	2×8	2	1	0.6	T25P41FBB065Z
43	1 11/16"	40	5×9	2×9	2	1	0.6	T25P43FBB06Z

Hex25 7° tapered rod for short skirt



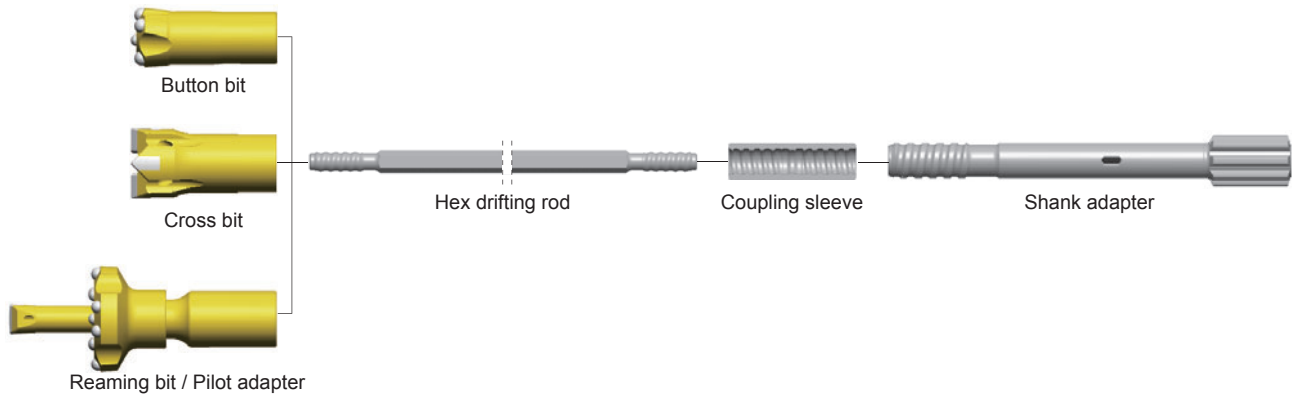
Effective Length(L)		Weight [Kg]	Part number
[mm]	[ft/in]		
1800	6'	8.2	TH25L18F
2200	7' 4"	9.9	TH25L22F
2400	8'	10.7	TH25L24F
2600	8' 6"	11.6	TH25L26F

D R I F T I N G & T U N N E L L I N G E Q U I P M E N T



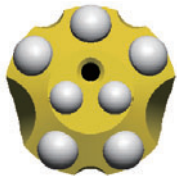
DRIFTING & TUNNELLING EQUIPMENT

R25 (1") SERIES (Recommended gauge diameter Ø33 - Ø45)



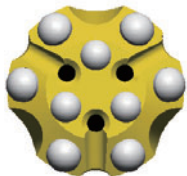
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.14

Button bit Type 06



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
33	1 5/16"	35	5×7	2×7	1	1	0.4	25RTPWS33R06M
33	1 5/16"	30	5×8	2×7	1	1	0.4	25RTPWS33R06L
35	1 3/8"	40	5×8	2×7	1	1	0.4	25RTPWS35R06H
37	1 15/32"	35	5×9	2×7	1	1	0.5	25RTPWS37R06M
38	1 1/2"	35	5×9	2×8	1	1	0.5	25RTPWS38R06M
41	1 5/8"	40	5×9	2×8	2	1	0.6	25RTPWS41R06H
43	1 11/16"	40	5×9	2×9	2	1	0.6	25RTPWS43R06H
45	1 3/4"	35	5×10	2×9	2	1	0.7	25RTPWS45R06M

Button bit Type 23



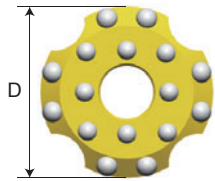
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
35	1 3/8"	35	6×7	3×7	1	3	0.4	25RTPWS35R23M
37	1 15/32"	35	6×7	3×7	1	3	0.5	25RTPWS37R23M
38	1 1/2"	35	6×8	3×7	1	3	0.5	25RTPWS38R23M
41	1 5/8"	40	6×8	3×7	1	3	0.6	25RTPWS41R23H
43	1 11/16"	35	6×8	3×8	1	3	0.6	25RTPWS43R23M
45	1 3/4"	30	6×9	3×8	1	3	0.7	25RTPWS45R23L

Cross bit



Gauge diameter		Carbide size W × H [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
35	1 3/8"	10×19	-	-	2	1	0.4	25RTC35V
38	1 1/2"	10×19	-	-	2	1	0.5	25RTC38V
41	1 5/8"	10×19	-	-	2	1	0.6	25RTC41V
45	1 3/4"	10×19	-	-	2	1	0.7	25RTC45V

Reaming bit / Pilot adapter 6° taper

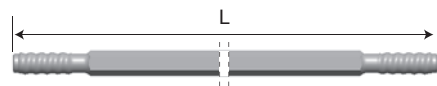


Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	30	6×9	3×8	-	-	1.0	WTHP64R11
76	3"	30	6×10	6×9	-	-	1.3	WTHP76R11
89	3 1/2"	30	8×11	8×10	-	-	1.7	WTHP89R15



Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole	Weight [Kg]	Part number
[mm]	[in]		Gauge	Face			
26	1"	8	-	-	1	1.4	WR25THI26B

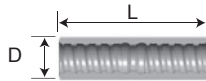
Hex drifting rod



Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R25 - R32	25	1"	2200	7' 2"	8.8	EH25R32R25-2200
			2475	8' 2"	10.2	EH25R32R25-2475
			2600	8' 6"	10.7	EH25R32R25-2600
			2800	9' 2"	11.2	EH25R32R25-2800
			3100	10' 2"	12.7	EH25R32R25-3100

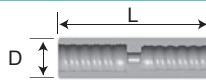
* Custom lengths may be available upon request

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R25 - R25	35	1 3/8"	160	6 1/4"	0.7	CR25
R32 - R32	45	1 3/4"	150	6"	1.0	CR32D

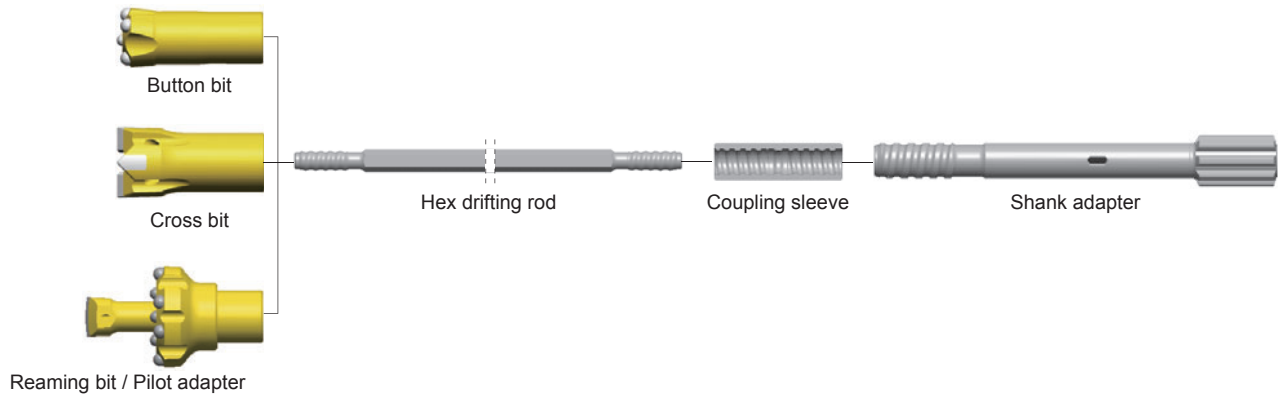
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R25 - R32	45	1 3/4"	175	6 7/8"	1.5	CR32R25

DRIFTING & TUNNELLING EQUIPMENT

R28 (1 1/8") SERIES (Recommended gauge diameter Ø37 - Ø45)



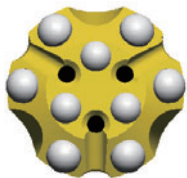
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.14

Button bit Type 06



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
37	1 15/32"	35	5×9	2×7	1	1	0.5	28RTPWS37R06M
38	1 1/2"	35	5×9	2×8	1	1	0.5	28RTPWS38R06M
41	1 5/8"	40	5×9	2×8	2	1	0.6	28RTPWS41R06H
43	1 11/16"	40	5×9	2×9	2	1	0.7	28RTPWS43R06H
45	1 3/4"	35	5×10	2×9	2	1	0.7	28RTPWS45R06M

Button bit Type 23



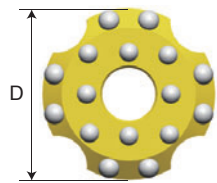
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
37	1 15/32"	35	6×7	3×7	1	3	0.5	28RTPWS37R23M
38	1 1/2"	35	6×8	3×7	1	3	0.5	28RTPWS38R23M
41	1 5/8"	40	6×8	3×7	1	3	0.6	28RTPWS41R23H
43	1 11/16"	35	6×8	3×8	1	3	0.7	28RTPWS43R23M
45	1 3/4"	30	6×9	3×8	1	3	0.7	28RTPWS45R23L

Cross bit



Gauge diameter		Carbide size W × H [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
38	1 1/2"	10×19	-	-	4	1	0.5	28RTC38V
41	1 5/8"	10×19	-	-	4	1	0.6	28RTC41V
43	1 11/16"	10×19	-	-	4	1	0.7	28RTC43V
45	1 3/4"	10×19	-	-	4	1	0.7	28RTC45V

Reaming bit / Pilot adapter 6° taper

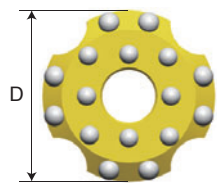


Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	30	6×9	3×8	-	-	1.0	WTHP64R11
76	3"	30	6×10	6×9	-	-	1.3	WTHP76R11
89	3 1/2"	30	8×11	8×10	-	-	1.7	WTHP89R15



Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Front		
26	1"	8	-	-	1	1	1.4	WR28THI26B

Reaming bit / Pilot adapter 12° taper

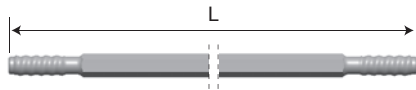


Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	30	8×11	4×10	-	-	1.6	WTKP89R15
102	4"	35	8×14	6×12	-	-	2.3	WTKP102R16
127	5"	35	12×13	8×13	-	-	4.8	WTKP127R16



Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Front		
40	1 5/8"	8	-	-	3	1	2.1	WR28TKI40B

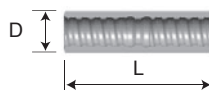
Hex drifting rod



Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R28 - R32	28	1 1/8"	2800	9'2"	14.1	EH28R32R28-2800
			3100	10'2"	15.8	EH28R32R28-3100
			3700	12'2"	19.2	EH28R32R28-3700
	32	1 1/4"	4310	14'2"	23.0	EH32R32R28-4310

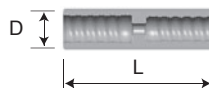
* Custom lengths may be available upon request

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R28 - R28	41	1 5/8"	160	6 1/4"	1.0	CR28D
R32 - R32	45	1 3/4"	150	6"	1.0	CR32D

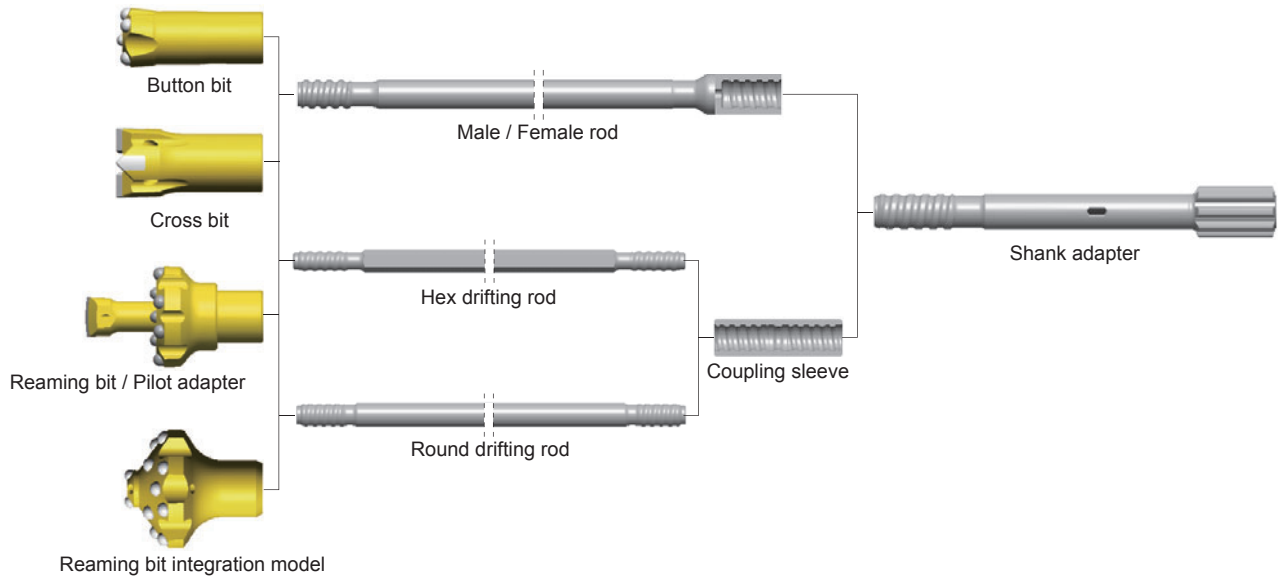
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R28 - R32	45	1 3/4"	171	6 3/4"	1.4	CR32R28

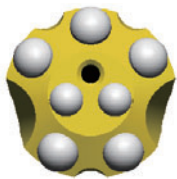
DRIFTING & TUNNELLING EQUIPMENT

R32 (1 1/4") SERIES (Recommended gauge diameter Ø41 - Ø64)



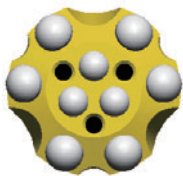
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.14

Button bit Type 06



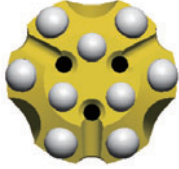
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
41	1 5/8"	40	5×9	2×8	2	1	0.6	32RTPWS41R06H
43	1 11/16"	40	5×9	2×9	2	1	0.7	32RTPWS43R06H
43	1 11/16"	30	5×10	2×8	2	1	0.7	32RTPWS43R06L
45	1 3/4"	35	5×10	2×9	2	1	0.8	32RTPWS45R06M
45	1 3/4"	30	5×11	2×9	2	1	0.8	32RTPWS45R06L
48	1 7/8"	30	5×11	2×9	2	1	0.9	32RTPWS48R06L
51	2"	30	5×12	2×10	2	1	1.0	32RTPWS51R06L

Button bit Type 03



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
43	1 11/16"	35	6×9	3×8	1	3	0.7	32RTPWS43R03M
43	1 11/16"	30	6×10	3×8	1	3	0.7	32RTPWS43R03L
45	1 3/4"	30	6×10	3×8	1	3	0.8	32RTPWS45R03L
48	1 7/8"	35	6×10	3×9	1	3	0.9	32RTPWS48R03M

Button bit Type 23



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
45	1 3/4"	30	6×9	3×8	1	3	0.8	32RTPWS45R23L
48	1 7/8"	30	6×10	3×9	1	3	0.9	32RTPWS48R23L
51	2"	30	6×10	3×9	1	3	1.0	32RTPWS51R23L
54	2 1/8"	40	6×10	3×10	1	3	1.1	32RTPWS54R23H
57	2 1/4"	40	6×11	3×10	1	3	1.2	32RTPWS57R23H
64	2 1/2"	35	6×12	3×11	1	3	1.4	32RTPWS64R23M

Button bit Type 08



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
43	1 11/16"	35	6×9	2×8	-	2	0.7	32RTPVS43BB08M
45	1 3/4"	35	6×9	2×9	-	2	0.8	32RTPVS45BB08M
48	1 7/8"	35	6×10	2×9	-	2	0.9	32RTPVS48BB08M

Button bit Type 09



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
43	1 11/16"	35	6×9	3×8	2	1	0.7	32RTPWS43BB09M
45	1 3/4"	35	6×9	3×9	2	1	0.8	32RTPWS45BB09M
48	1 7/8"	35	6×9	3×9	2	1	0.9	32RTPWS48BB09M

Cross bit

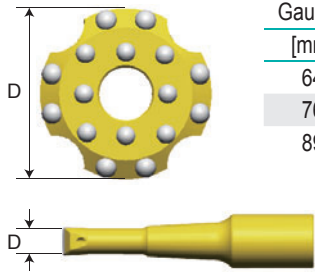


Gauge diameter		Carbide size W × H [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
41	1 5/8"	10×19	-	-	4	1	0.6	32RTC41V
45	1 3/4"	10×19	-	-	4	1	0.7	32RTC45V
48	1 7/8"	10×19	-	-	4	1	0.9	32RTC48V
51	2"	10×19	-	-	4	1	1.0	32RTC51V

DRIFTING & TUNNELLING EQUIPMENT

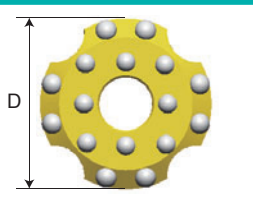
R32 (1 1/4") SERIES (Recommended gauge diameter Ø41 - Ø57)

Reaming bit / Pilot adapter 6° taper

	Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face	Side	Face		
	64	2 1/2"	30	6×9	3×8	-	-	1.0	WTHP64R11
	76	3"	30	6×10	6×9	-	-	1.3	WTHP76R11
	89	3 1/2"	30	8×11	8×10	-	-	1.7	WTHP89R15

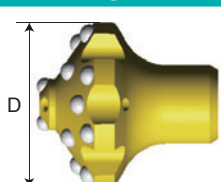
	Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face	Side	Front		
	26	1"	8	-	-	1	1	1.7	WR32THI26B

Reaming bit / Pilot adapter 12° taper

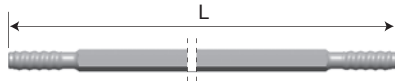
	Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face	Side	Face		
	89	3 1/2"	30	8×11	4×10	-	-	1.6	WTKP89R15
	102	4"	35	8×14	6×12	-	-	2.3	WTKP102R16
	127	5"	35	12×13	8×13	-	-	4.8	WTKP127R16

	Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face	Side	Front		
	40	1 5/8"	8	-	-	3	1	2.1	WR32TKI40B

Reaming bit integration model

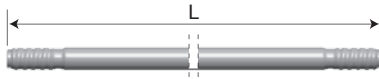
	Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole			Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face	Side	Face	Reverse		
	76	3"	35	8×12	6×10	2	1	2	2.2	WI32RTPJ76R-30R
	89	3 1/2"	35	8×12	10×10	2	1	2	2.5	WI32RTPJ89R-30R
	102	4"	35	8×12	9×12, 2×10	2	1	2	2.7	WI32RTPJ102R-30R

Hex Drifting rod



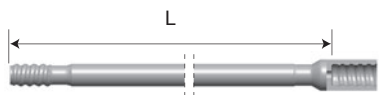
Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R32 - R38	32	1 1/4"	3100	10' 2"	19.7	EH32R38R32-3100
			3700	12' 2"	23.3	EH32R38R32-3700
			4310	14' 2"	27.0	EH32R38R32-4310
			4920	16' 2"	30.9	EH32R38R32-4920
	35	1 3/8"	3100	10' 2"	23.9	EH35R38R32-3100
			3700	12' 2"	28.5	EH35R38R32-3700
			4310	14' 2"	33.2	EH35R38R32-4310
			4920	16' 2"	36.7	EH35R38R32-4920
R32 - T38	32	1 1/4"	5530	18' 2"	41.3	EH35R38R32-5530
			3100	10' 2"	19.7	EH32M38R32-3100
			3700	12' 2"	23.3	EH32M38R32-3700
			4310	14' 2"	27.0	EH32M38R32-4310
	35	1 3/8"	4920	16' 2"	30.9	EH32M38R32-4920
			3100	10' 2"	23.9	EH35M38R32-3100
			3700	12' 2"	28.5	EH35M38R32-3700
			4310	14' 2"	33.2	EH35M38R32-4310
	35	1 3/8"	4920	16' 2"	36.7	EH35M38R32-4920
			5530	18' 2"	41.3	EH35M38R32-5530

Round Drifting rod



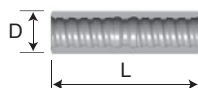
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R32 - R32	32	1 1/4"	1830	6'	8.0	ER32R32-1830
			2440	8'	11.5	ER32R32-2440
			3050	10'	16.2	ER32R32-3050
			3660	12'	19.5	ER32R32-3660

Male / Female Drifting rod



Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R32 - R32	32	1 1/4"	1830	6'	9.4	ER32R32MF-1830
			2440	8'	12.9	ER32R32MF-2440
			3050	10'	17.4	ER32R32MF-3050
			3660	12'	20.6	ER32R32MF-3660

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R32 - R32	45	1 3/4"	150	6"	1.0	CR32D
R38 - R38	54	2 1/8"	170	6 3/4"	1.7	CR38D

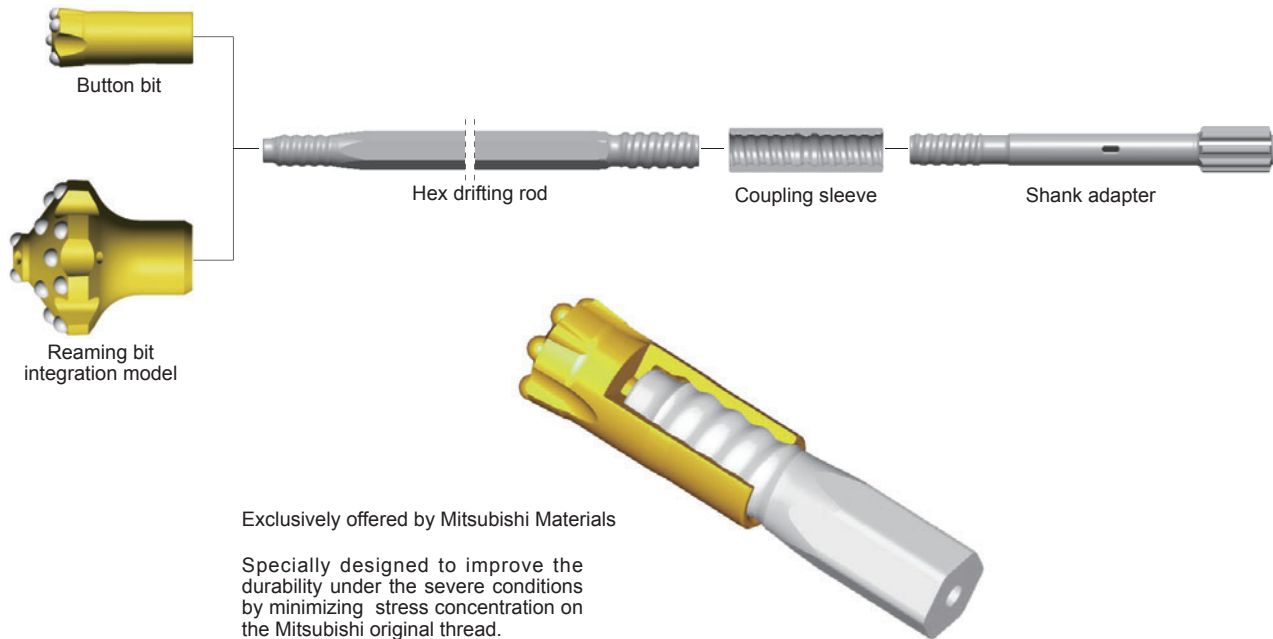
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R32 - R25	45	1 3/4"	175	6 7/8"	1.5	CR32R25
R32 - R28	45	1 3/4"	171	6 3/4"	1.4	CR32R28
R32 - R38	54	2 1/8"	181	7 1/8"	2.1	CR38R32
R32 - T38	54	2 1/8"	188	7 1/2"	2.2	CM38R32

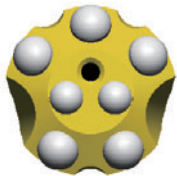
DRIFTING & TUNNELLING EQUIPMENT

NR34 (1 1/3") SERIES (Recommended gauge diameter Ø45 - Ø54)



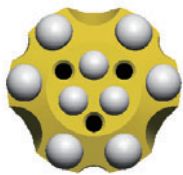
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.14

Button bit Type 06



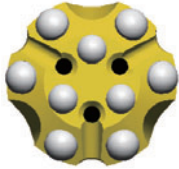
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
45	1 3/4"	30	5×11	2×9	2	1	0.8	34NRTPWS45R06L
48	1 7/8"	30	5×11	2×9	2	1	0.9	34NRTPWS48R06L
51	2"	30	5×12	2×10	2	1	1.0	34NRTPWS51R06L

Button bit Type 03



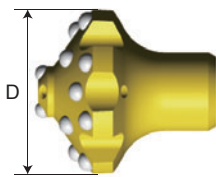
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
45	1 3/4"	30	6×10	3×8	1	3	0.8	34NRTPWS45R03L
48	1 7/8"	35	6×10	3×9	1	3	0.9	34NRTPWS48R03M

Button bit Type 23



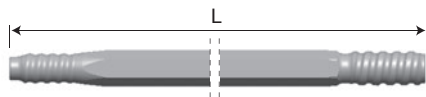
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
51	2"	30	6×10	3×9	1	3	1.0	34NRTPWS51R23L
54	2 1/8"	40	6×10	3×10	1	3	1.1	34NRTPWS54R23H

Reaming bit integration model



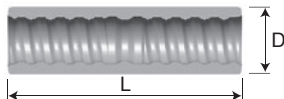
Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole			Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face	Reverse		
76	3"	35	8×12	6×10	2	1	2	2.3	WI34NRTPJ76R-30R
89	3 1/2"	35	8×12	10×10	2	1	2	2.6	WI34NRTPJ89R-30R
102	4"	35	8×12	9×12, 2×10	2	1	2	2.8	WI34NRTPJ102R-30R

Hex drifting rod



Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
NR34 - T38	35	1 3/8"	3100	10' 2"	24.8	EH35M38NR34-3100
			3700	12' 2"	29.5	EH35M38NR34-3700
			4310	14' 2"	34.1	EH35M38NR34-4310
			4920	16' 2"	37.6	EH35M38NR34-4920
			5530	18' 2"	42.3	EH35M38NR34-5530

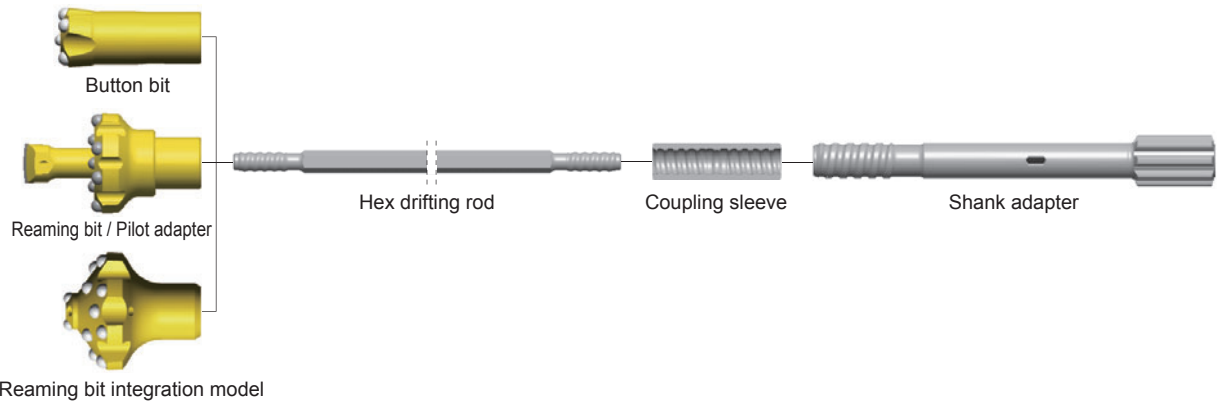
Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T38 - T38	54	2 1/8"	190	7 1/2"	2.0	CM38

DRIFTING & TUNNELLING EQUIPMENT

R35 (1 3/8") SERIES (Recommended gauge diameter Ø48 - Ø64)



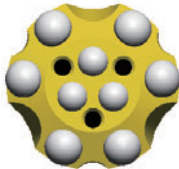
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.14

Button bit Type 06



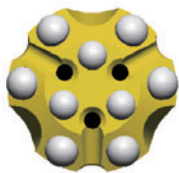
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
48	1 7/8"	30	5×11	2×9	2	1	0.8	35RTPWS48R06L
51	2"	30	5×12	2×10	2	1	0.9	35RTPWS51R06L

Button bit Type 03



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
48	1 7/8"	35	6×10	3×9	1	3	0.8	35RTPWS48R03M

Button bit Type 23



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
48	1 7/8"	30	6×10	3×9	1	3	0.8	35RTPWS48R23L
51	2"	30	6×10	3×9	1	3	0.9	35RTPWS51R23L
54	2 1/8"	40	6×10	3×9	1	3	1.0	35RTPWS54R23H
57	2 1/4"	40	6×11	3×10	1	3	1.1	35RTPWS57R23H
64	2 1/2"	35	6×12	3×11	1	3	1.3	35RTPWS64R23M

Button bit Type 08



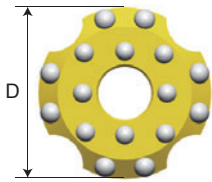
Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
48	1 7/8"	35	6×10	2×9	-	2	0.8	35RTPVS48BB08M

Button bit Type 09



Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
48	1 7/8"	35	6×9	3×9	2	1	0.8	35RTPWS48BB09M

Reaming bit / Pilot adapter 12° taper

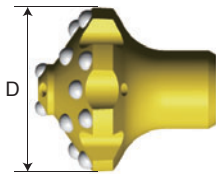


Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	30	8×11	4×10	-	-	1.6	WTKP89R15
102	4"	35	8×14	6×12	-	-	2.3	WTKP102R16
127	5"	35	12×13	8×13	-	-	4.8	WTKP127R16



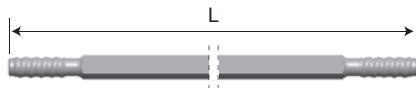
Gauge diameter(D)		Carbide size [mm]	Button × Button dia. [mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Front		
40	1 9/16"	8	-	-	3	1	1.5	WR35TKI40B

Reaming bit integration model



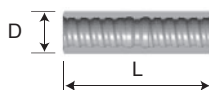
Gauge diameter(D)		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole			Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face	Reverse		
76	3"	35	8×12	6×10	2	1	2	2.3	WI35RTPJ76R-30R
89	3 1/2"	35	8×12	10×10	2	1	2	2.7	WI35RTPJ89R-30R
102	4"	35	8×12	9×12, 2×10	2	1	2	2.9	WI35RTPJ102R-30R

Hex drifting rod



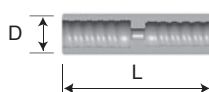
Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
R35 - T38	35	1 3/8"	4310	14' 2"	33.3	EH35M38R35-4310
			4920	16' 2"	36.8	EH35M38R35-4920
			5530	18' 2"	41.4	EH35M38R35-5530

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R35 - R35	48	1 7/8"	160	6 1/4"	1.2	CR35D

Crossover coupling



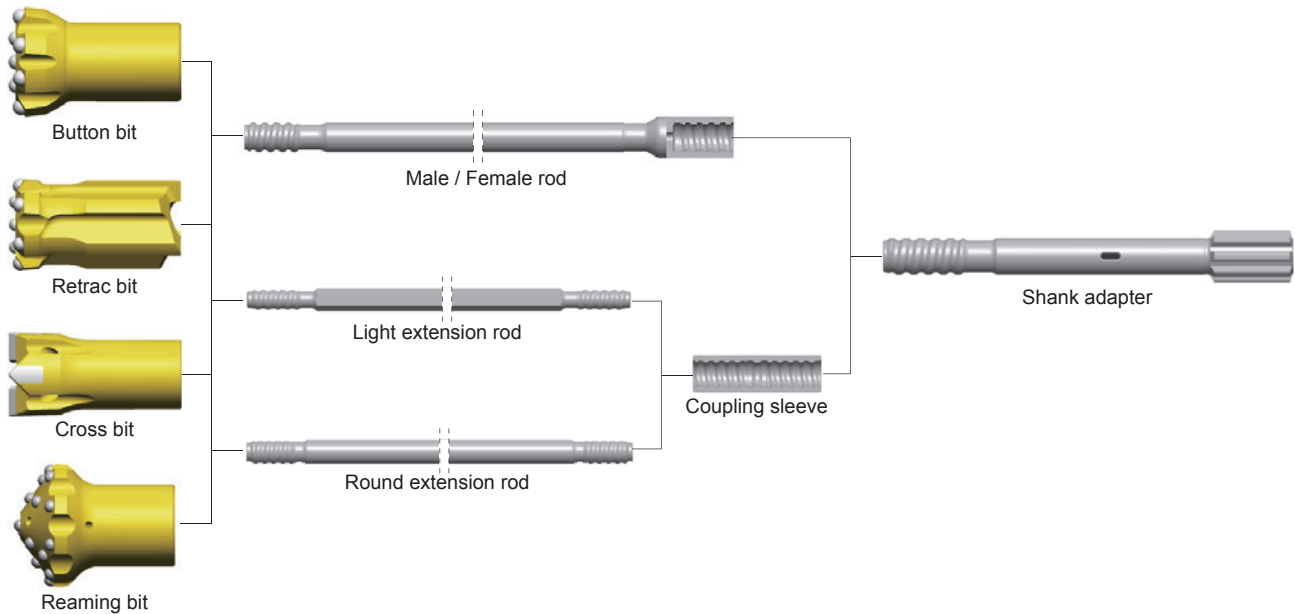
Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
R35 - R32	48	1 7/8"	171	6 3/4"	1.5	CR35R32

BENCH & LONGHOLE DRILLING EQUIPMENT



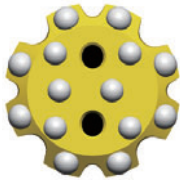
BENCH & LONG HOLE DRILLING EQUIPMENT

T38 (1 1/2") SERIES (Recommended gauge diameter Ø64 - Ø102)



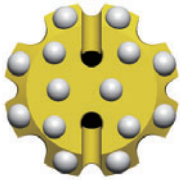
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.16

Button bit Type 15



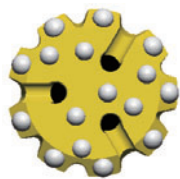
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	35	8×11	4×10	-	2	1.6	38MPVS64R15M
64	2 1/2"	40	8×10	5×10	-	2	1.6	38MPVS64R15H
70	2 3/4"	35	8×11	4×11	-	2	1.9	38MPVS70R15M
70	2 3/4"	40	8×11	5×10	-	2	1.9	38MPVS70R15H
76	3"	35	8×12	4×11	-	2	2.2	38MPVS76R15M
76	3"	40	8×11	5×11	-	2	2.2	38MPVS76R15H
89	3 1/2"	35	8×13	6×12	-	2	3.4	38MPVS89R15M
89	3 1/2"	40	8×12	6×12	-	2	3.4	38MPVS89R15H
102	4"	35	8×14	6×13	-	2	4.5	38MPVS102R15M
102	4"	40	8×13	6×13	-	2	4.5	38MPVS102R15H

Button bit Type 25



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	3.3	38MPVS89R25M
102	4"	35	8×14	6×13	-	2	4.4	38MPVS102R25M

Button bit Type 23



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	9×12	6×12	-	3	3.4	38MPVS89R23M
102	4"	35	9×13	6×13	-	3	4.5	38MPVS102R23M

Button bit Type 53 & 55



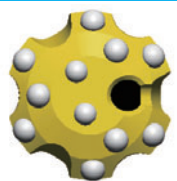
Type 53 (Ø64-Ø89)



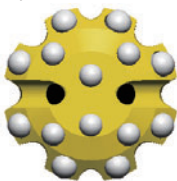
Type 55 (Ø76-Ø102)

Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	35	6×10	4×10	-	3	1.6	38MPVS64R53M
70	2 3/4"	35	6×11	4×11	-	3	1.8	38MPVS70R53M
76	3"	35	6×12	4×11	-	3	2.1	38MPVS76R53M
76	3"	35	8×11	5×11	-	4	2.2	38MPVS76R55M
89	3 1/2"	35	6×13	5×12	-	3	3.3	38MPVS89R53M
89	3 1/2"	35	8×12	6×12	-	4	3.4	38MPVS89R55M
102	4"	35	8×14	6×14	-	4	4.4	38MPVS102R55M

Button bit Type 83 & 85



Type 83 (Ø64-Ø76)



Type 85 (Ø76-Ø102)

Gauge diameter		* Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	20-40	6×10	3×10, 2×9	1	1	1.6	38MPWS64BB83H
70	2 3/4"	20-40	6×11	5×10	1	1	1.8	38MPWS70BB83H
76	3"	20-40	6×11	3×11, 2×10	1	1	2.1	38MPWS76BB83H
76	3"	20-40	8×11	6×10	2	2	2.2	38MPWS76BB85H
89	3 1/2"	20-40	8×12	6×12	2	2	3.4	38MPWS89BB85H
102	4"	20-40	8×12	7×12	-	2	4.4	38MPVS102BB85H

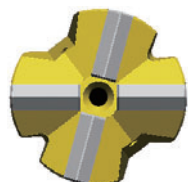
* Face angle 20°, Gauge angle 40°

Button bit Type 14



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	35	7×11	4×10	-	3	1.6	38MPVS64R14M
70	2 3/4"	35	7×11	4×11	-	3	1.8	38MPVS70R14M
76	3"	35	7×12	4×11	-	3	2.2	38MPVS76R14M
89	3 1/2"	35	7×14	5×12	-	3	3.4	38MPVS89R14M
102	4"	35	7×14	5×13	-	3	4.4	38MPVS102R14M

Cross bit

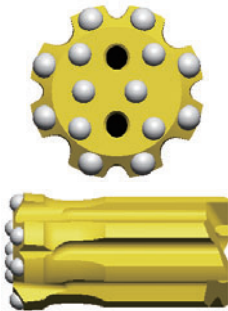


Gauge diameter		Carbide size W × H [mm]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	13×22	-	-	4	1	1.8	38MX64S
76	3"	13×22	-	-	4	1	2.4	38MX76S2

BENCH & LONG HOLE DRILLING EQUIPMENT

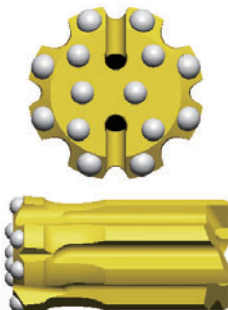
T38 (1 1/2") SERIES (Recommended gauge diameter Ø64 - Ø102)

Retrac Button bit Type 15



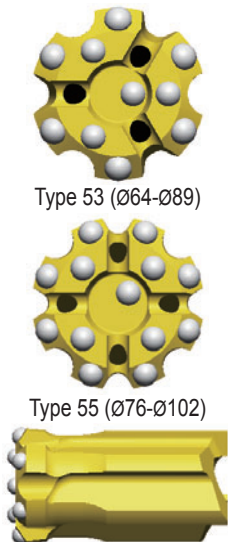
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	35	8×11	4×10	-	2	2.1	38MPVR64R15M
70	2 3/4"	35	8×11	4×11	-	2	2.6	38MPVR70R15M
76	3"	35	8×12	4×11	-	2	3.1	38MPVR76R15M
89	3 1/2"	35	8×13	6×12	-	2	4.4	38MPVR89R15M
102	4"	35	8×14	6×13	-	2	6.6	38MPVR102R15M

Retrac Button bit Type 25



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.4	38MPVR89R25M
102	4"	35	8×14	6×13	-	2	6.5	38MPVR102R25M

Retrac Button bit Type 53 & 55

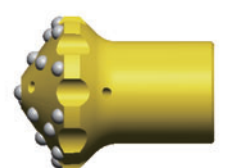


Type 53 (Ø64-Ø89)

Type 55 (Ø76-Ø102)

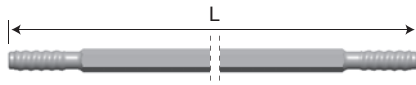
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
64	2 1/2"	35	6×10	4×10	-	3	2.0	38MPVR64R53M
70	2 3/4"	35	6×11	4×11	-	3	2.5	38MPVR70R53M
76	3"	35	6×12	4×11	-	3	2.9	38MPVR76R53M
76	3"	35	8×11	5×11	-	4	3.0	38MPVR76R55M
89	3 1/2"	35	6×13	5×12	-	3	4.3	38MPVR89R53M
89	3 1/2"	35	8×12	6×12	-	4	4.4	38MPVR89R55M
102	4"	35	8×14	6×14	-	4	6.5	38MPVR102R55M

Reaming bit integration model



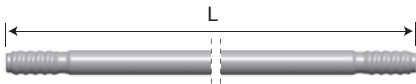
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
127	5"	35	9×13	10×13	3	1	7.5	WI38MPJ127R-D
152	6"	35	9×14	11×14	3	1	10.5	WI38MPJ152R-D

Light extension rod



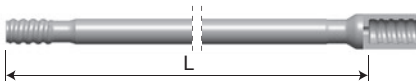
Thread	Hex		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T38 - T38	32	1 1/4"	3050	10'	18.4	EH32M38-3050
			3660	12'	22.1	EH32M38-3660

Round extension rod



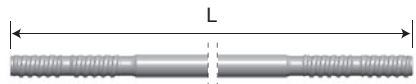
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T38 - T38	38	1 1/2"	3050	10'	24.7	ER38M38-3050
			3660	12'	29.4	ER38M38-3660
			4270	14'	34.7	ER38M38-4270
			4880	16'	39.7	ER38M38-4880
			5490	18'	44.6	ER38M38-5490

Male / Female rod



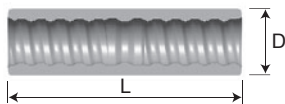
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T38 - T38	38	1 1/2"	900	3'	8.0	ER38M38MF-900
			1220	4'	9.7	ER38M38MF-1220
			1525	5'	13.3	ER38M38MF-1525
			1830	6'	16.0	ER38M38MF-1830
			2440	8'	21.3	ER38M38MF-2440
			3050	10'	25.9	ER38M38MF-3050
			3660	12'	30.7	ER38M38MF-3660

Tandem rod



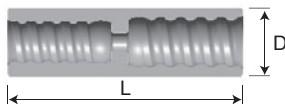
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T38 - T38	38	1 1/2"	3050	10'	24.4	ER38M38T-3050
			3660	12'	29.3	ER38M38T-3660

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T38 - T38	54	2 1/8"	190	7 1/2"	2.0	CM38

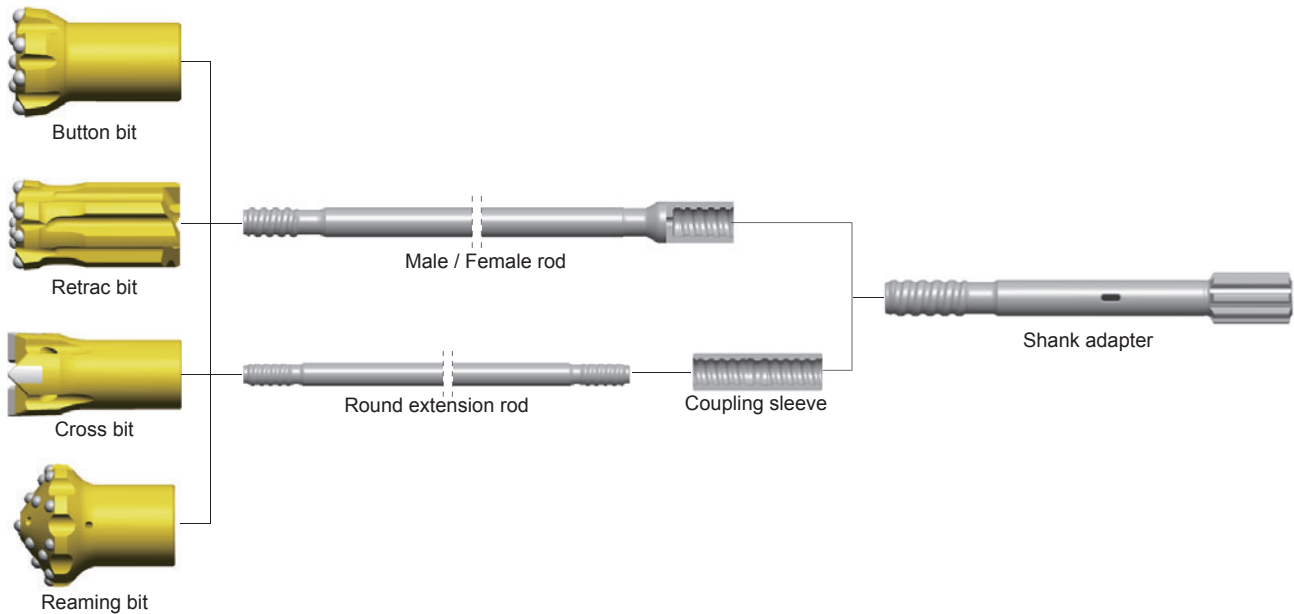
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T38 - R32	54	2 1/8"	188	7 1/2"	2.2	CM38R32
T38 - T45	63	2 1/2"	215	8 1/2"	3.4	CM45M38

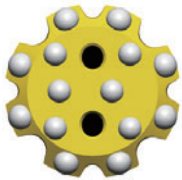
BENCH & LONG HOLE DRILLING EQUIPMENT

T45 (1 3/4") SERIES (Recommended gauge diameter Ø70 - Ø115)



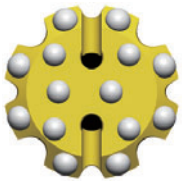
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.16

Button bit Type 15



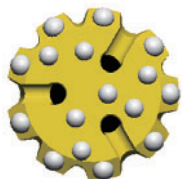
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
70	2 3/4"	35	8×11	4×11	-	2	1.9	45MPVS70R15M
70	2 3/4"	40	8×11	5×10	-	2	1.9	45MPVS70R15H
76	3"	35	8×12	4×11	-	2	2.3	45MPVS76R15M
76	3"	40	8×11	5×11	-	2	2.3	45MPVS76R15H
89	3 1/2"	35	8×13	6×12	-	2	3.8	45MPVS89R15M
89	3 1/2"	40	8×12	6×12	-	2	3.8	45MPVS89R15H
102	4"	35	8×14	6×13	-	2	4.4	45MPVS102R15M
102	4"	40	8×13	6×13	-	2	4.4	45MPVS102R15H

Button bit Type 25



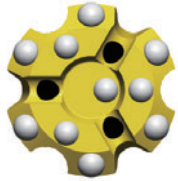
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	3.7	45MPVS89R25M
102	4"	35	8×14	6×13	-	2	4.3	45MPVS102R25M
115	4 1/2"	35	8×14	7×13	-	2	6.3	45MPVS115R25M

Button bit Type 23

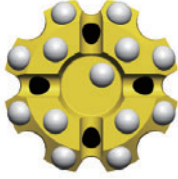


Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	9×12	6×12	-	3	3.8	45MPVS89R23M
102	4"	35	9×13	6×13	-	3	4.4	45MPVS102R23M
115	4 1/2"	35	9×13	7×13	-	3	6.4	45MPVS115R23MS

Button bit Type 53 & 55



Type 53 (Ø70-Ø89)



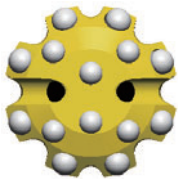
Type 55 (Ø76-Ø115)

Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
70	2 3/4"	35	6×11	4×11	-	3	1.8	45MPVS70R53M
76	3"	35	6×12	4×11	-	3	2.2	45MPVS76R53M
76	3"	35	8×11	5×11	-	4	2.3	45MPVS76R55M
89	3 1/2"	35	6×13	5×12	-	3	3.6	45MPVS89R53M
89	3 1/2"	35	8×12	6×12	-	4	3.7	45MPVS89R55M
102	4"	35	8×14	6×14	-	4	4.3	45MPVS102R55M
115	4 1/2"	35	8×14	8×14	-	4	6.3	45MPVS115R55M

Button bit Type 83 & 85



Type 83 (Ø70-Ø76)

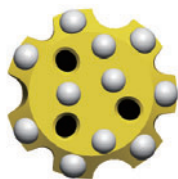


Type 85 (Ø76-Ø115)

Gauge diameter		* Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
70	2 3/4"	20-40	6×11	5×10	1	1	1.8	45MPWS70BB83H
76	3"	20-40	6×11	3×11, 2×10	1	1	2.2	45MPWS76BB83H
76	3"	20-40	8×11	6×10	2	2	2.3	45MPWS76BB85H
89	3 1/2"	20-40	8×12	6×12	2	2	3.6	45MPWS89BB85H
102	4"	20-40	8×12	7×12	-	2	4.3	45MPVS102BB85H
115	4 1/2"	20-40	8×14	8×12	-	2	6.3	45MPVS115BB85H

* Face angle 20°, Gauge angle 40°

Button bit Type 14



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
70	2 3/4"	35	7×11	4×11	-	3	1.8	45MPVS70R14M
76	3"	35	7×12	4×11	-	3	2.3	45MPVS76R14M
89	3 1/2"	35	7×14	5×12	-	3	3.6	45MPVS89R14M
102	4"	35	7×14	5×13	-	3	4.3	45MPVS102R14M

Cross bit

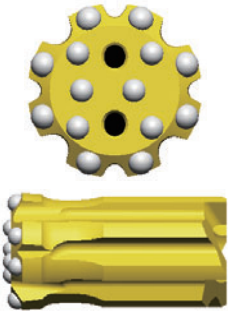


Gauge diameter		Carbide size W × H [mm]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
76	3"	13×22	-	-	4	1	2.5	45MX76S2
89	3 1/2"	13×22	-	-	4	1	4.0	45MX89S

BENCH & LONG HOLE DRILLING EQUIPMENT

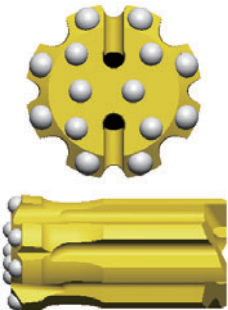
T45 (1 3/4") SERIES (Recommended gauge diameter Ø76 - Ø115)

Retrac Button bit Type 15



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
76	3"	35	8×12	4×11	-	2	3.0	45MPVR76R15M
89	3 1/2"	35	8×13	6×12	-	2	4.5	45MPVR89R15M
102	4"	35	8×14	6×13	-	2	6.6	45MPVR102R15M

Retrac Button bit Type 25

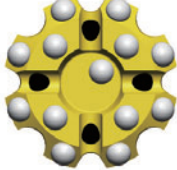


Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.4	45MPVR89R25M
102	4"	35	8×14	6×13	-	2	6.5	45MPVR102R25M
115	4 1/2"	35	8×14	7×13	-	2	8.4	45MPVR115R25M

Retrac Button bit Type 53 & 55



Type 53 (Ø76-Ø89)

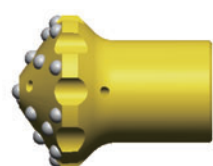


Type 55 (Ø76-Ø102)



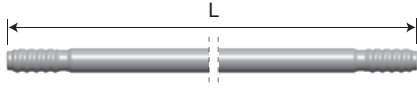
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
76	3"	35	6×12	4×11	-	3	2.9	45MPVR76R53M
76	3"	35	8×11	5×11	-	4	3.0	45MPVR76R55M
89	3 1/2"	35	6×13	5×12	-	3	4.2	45MPVR89R53M
89	3 1/2"	35	8×12	6×12	-	4	4.5	45MPVR89R55M
102	4"	35	8×14	6×14	-	4	6.5	45MPVR102R55M
115	4 1/2"	35	8×14	8×14	-	4	8.4	45MPVR115R55M

Reaming bit integration model



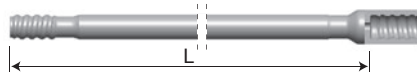
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
127	5"	35	9×13	10×13	3	1	7.5	WI45MPJ127R-D
152	6"	35	9×14	11×14	3	1	10.5	WI45MPJ152R-D

Round extension rod



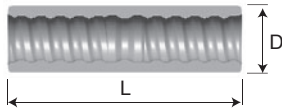
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T45 - T45	45	1 3/4"	3050	10'	34.1	ER45M45-3050
			3660	12'	41.0	ER45M45-3660
			4270	14'	48.1	ER45M45-4270
			4880	16'	54.9	ER45M45-4880
			6100	20'	68.9	ER45M45-6100

Male / Female rod



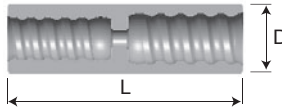
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T45 - T45	45	1 3/4"	1525	5'	18.4	ER45M45MF-1525
			1830	6'	22.1	ER45M45MF-1830
			3050	10'	36.1	ER45M45MF-3050
			3660	12'	43.3	ER45M45MF-3660
			4270	14'	50.2	ER45M45MF-4270

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T45 - T45	63	2 1/2"	210	8 1/4"	3.0	CM45
T45 - T45	66	2 5/8"	210	8 1/4"	3.5	CM45-2

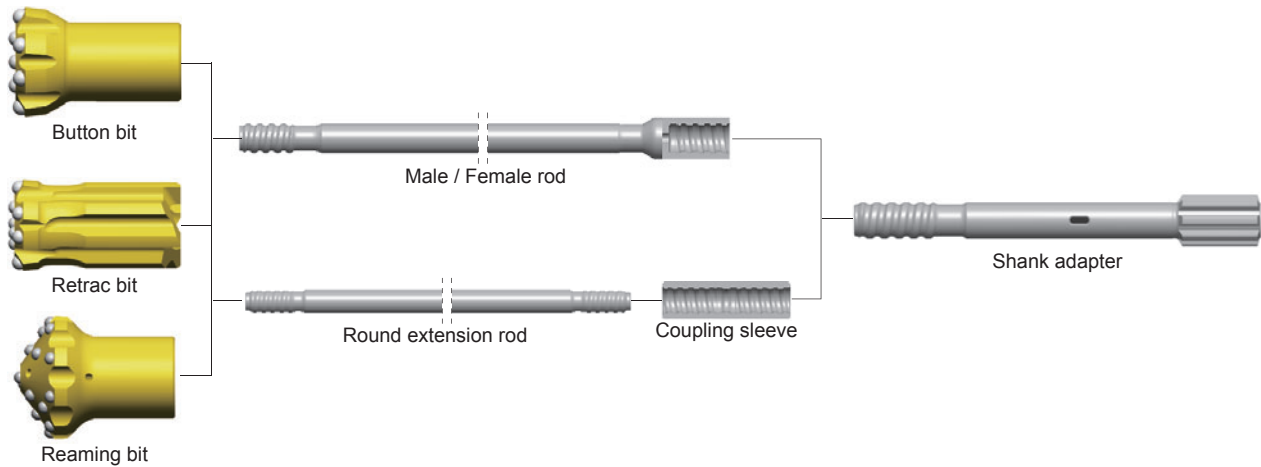
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T45 - T38	63	2 1/2"	215	8 1/2"	3.4	CM45M38
T45 - T51	72	2 7/8"	240	9 1/2"	5.0	CM51M45

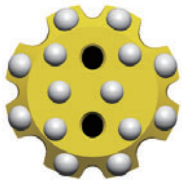
BENCH & LONG HOLE DRILLING EQUIPMENT

T51 (2") SERIES (Recommended gauge diameter Ø89 - Ø127)



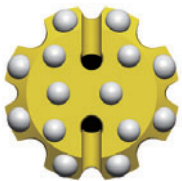
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.16

Button bit Type 15



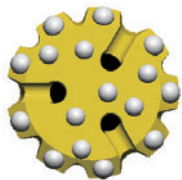
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.1	51MPVS89R15M
89	3 1/2"	40	8×12	6×12	-	2	4.1	51MPVS89R15H
102	4"	35	8×14	6×13	-	2	5.2	51MPVS102R15M
102	4"	40	8×13	6×13	-	2	5.2	51MPVS102R15H

Button bit Type 25



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.0	51MPVS89R25M
102	4"	35	8×14	6×13	-	2	5.1	51MPVS102R25M
115	4 1/2"	35	8×14	7×13	-	2	6.6	51MPVS115R25M
127	5"	35	8×16	8×14	-	2	8.7	51MPVS127R25M

Button bit Type 23



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	9×12	6×12	-	3	4.1	51MPVS89R23M
102	4"	35	9×13	6×13	-	3	5.2	51MPVS102R23M
115	4 1/2"	35	9×13	7×13	-	3	6.7	51MPVS115R23MS
115	4 1/2"	35	9×14	7×14	-	3	6.8	51MPVS115R23M
127	5"	35	9×14	7×14	-	3	8.8	51MPVS127R23MS
127	5"	35	9×16	7×16	-	3	8.9	51MPVS127R23M

Button bit Type 53 & 55



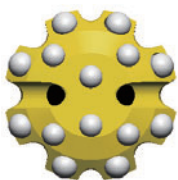
Type 53 (Ø89)



Type 55 (Ø89-Ø127)

Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	6×13	5×12	-	3	3.9	51MPVS89R53M
89	3 1/2"	35	8×12	6×12	-	4	4.0	51MPVS89R55M
102	4"	35	8×14	6×14	-	4	5.1	51MPVS102R55M
115	4 1/2"	35	8×14	8×14	-	4	6.6	51MPVS115R55M
127	5"	35	8×16	4×16, 4×14	-	4	8.7	51MPVS127R55M

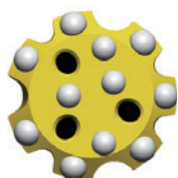
Button bit Type 85



Gauge diameter		* Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	20-40	8×12	6×12	2	2	3.9	51MPWS89BB85H
102	4"	20-40	8×12	7×12	-	2	5.0	51MPVS102BB85H
115	4 1/2"	20-40	8×14	8×12	-	2	6.5	51MPVS115BB85H
127	5"	20-40	8×14	4×14, 4×12	-	2	8.6	51MPVS127BB85H

* Face angle 20°, Gauge angle 40°

Button bit Type 14

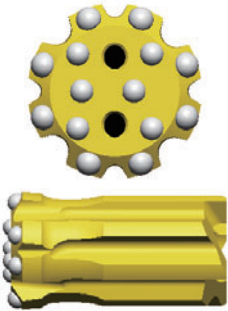


Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	7×14	5×12	-	3	4.0	51MPVS89R14M
102	4"	35	7×14	5×13	-	3	5.1	51MPVS102R14M

BENCH & LONG HOLE DRILLING EQUIPMENT

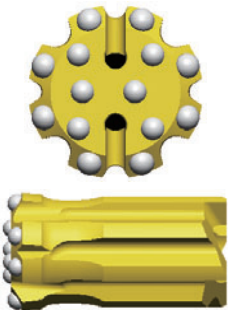
T51 (2") SERIES (Recommended gauge diameter Ø89 - Ø127)

Retrac Button bit Type 15



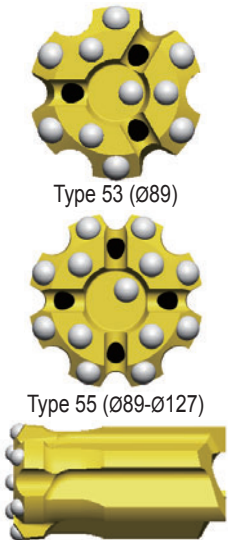
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.4	51MPVR89R15M
102	4"	35	8×14	6×13	-	2	6.5	51MPVR102R15M

Retrac Button bit Type 25



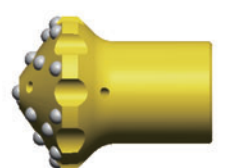
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.3	51MPVR89R25M
102	4"	35	8×14	6×13	-	2	6.4	51MPVR102R25M
115	4 1/2"	35	8×14	7×13	-	2	8.3	51MPVR115R25M
127	5"	35	8×16	8×14	-	2	10.7	51MPVR127R25M

Retrac Button bit Type 53 & 55



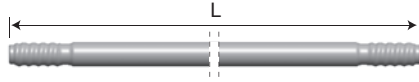
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	6×13	5×12	-	3	4.2	51MPVR89R53M
89	3 1/2"	35	8×12	6×12	-	4	4.3	51MPVR89R55M
102	4"	35	8×14	6×14	-	4	6.4	51MPVR102R55M
115	4 1/2"	35	8×14	8×14	-	4	8.3	51MPVR115R55M
127	5"	35	8×16	4×16, 4×14	-	4	10.7	51MPVR127R55M

Reaming bit integration model



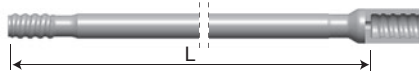
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
152	6"	35	9×14	11×14	3	1	10.6	WI51MPJ152R-D

Round extension rod



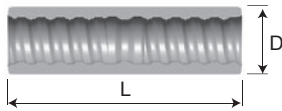
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T51 - T51	51	2"	3660	12'	49.6	ER51M51-3660
			4270	14'	58.1	ER51M51-4270
			6100	20'	82.9	ER51M51-6100

Male / Female rod



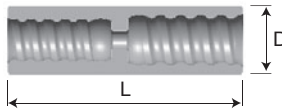
Thread	Outside diameter		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
T51 - T51	51	2"	1525	5'	22.0	ER51M51MF-1525
			1830	6'	26.4	ER51M51MF-1830
			3660	12'	52.8	ER51M51MF-3660
			4270	14'	61.6	ER51M51MF-4270

Coupling sleeve



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T51 - T51	72	2 7/8"	235	9 1/4"	4.4	CM51
T51 - T51	77	3"	235	9 1/4"	5.5	CM51-2

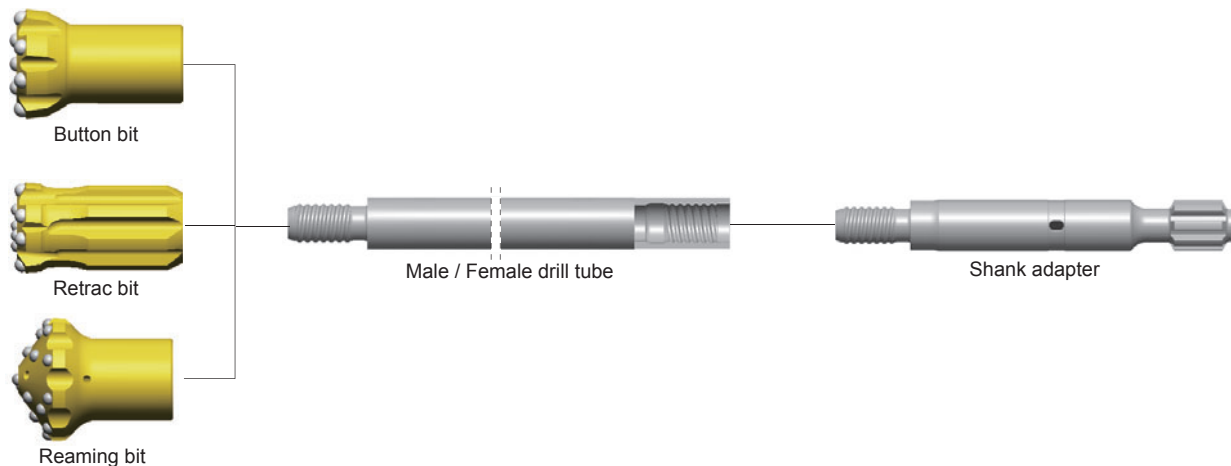
Crossover coupling



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[in]		
T51 - T45	72	2 7/8"	240	9 1/2"	5.0	CM51M45

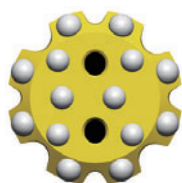
TUBE DRILLING EQUIPMENT

ST58 (2 1/4") SERIES (Recommended gauge diameter Ø89 - Ø127)



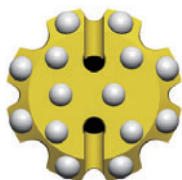
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.16

Button bit Type 15



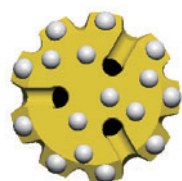
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	4.0	58WDPVS89R15M
89	3 1/2"	40	8×12	6×12	-	2	4.0	58WDPVS89R15H
102	4"	35	8×14	6×13	-	2	5.0	58WDPVS102R15M
102	4"	40	8×13	6×13	-	2	4.9	58WDPVS102R15H

Button bit Type 25



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	3.9	58WDPVS89R25M
102	4"	35	8×14	6×13	-	2	4.9	58WDPVS102R25M
115	4 1/2"	35	8×14	7×13	-	2	6.9	58WDPVS115R25M
127	5"	35	8×16	8×14	-	2	8.9	58WDPVS127R25M

Button bit Type 23



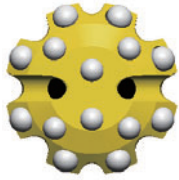
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	9×12	6×12	-	3	3.9	58WDPVS89R23M
102	4"	35	9×13	6×13	-	3	5.0	58WDPVS102R23M
115	4 1/2"	35	9×13	7×13	-	3	6.9	58WDPVS115R23MS
115	4 1/2"	35	9×14	7×14	-	3	7.0	58WDPVS115R23M
127	5"	35	9×14	7×14	-	3	8.9	58WDPVS127R23MS
127	5"	35	9×16	7×16	-	3	9.0	58WDPVS127R23M

Button bit Type 55



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×12	6×12	-	4	3.8	58WDPVS89R55M
102	4"	35	8×14	6×14	-	4	4.9	58WDPVS102R55M
115	4 1/2"	35	8×14	8×14	-	4	6.9	58WDPVS115R55M
127	5"	35	8×16	4×16, 4×14	-	4	8.9	58WDPVS127R55M

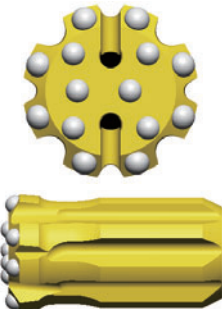
Button bit Type 85



Gauge diameter		* Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	20-40	8×12	6×12	2	2	3.7	58WDPWS89BB85H
102	4"	20-40	8×13	7×12	-	2	4.8	58WDPVS102BB85H
115	4 1/2"	20-40	8×14	8×12	-	2	6.8	58WDPVS115BB85H
127	5"	20-40	8×14	4×14, 4×12	-	2	8.8	58WDPVS127BB85H

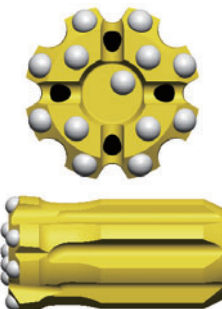
* Face angle 20°, Gauge angle 40°

Retrac Button bit Type 25



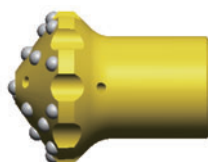
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×13	6×12	-	2	5.6	58WDPVR89R25M
102	4"	35	8×14	6×13	-	2	7.8	58WDPVR102R25M
115	4 1/2"	35	8×14	7×13	-	2	10.6	58WDPVR115R25M
127	5"	35	8×16	8×14	-	2	12.8	58WDPVR127R25M

Retrac Button bit Type 55



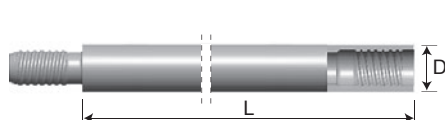
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
89	3 1/2"	35	8×12	6×12	-	4	5.4	58WDPVR89R55M
102	4"	35	8×14	6×14	-	4	7.6	58WDPVR102R55M
115	4 1/2"	35	8×14	8×14	-	4	10.4	58WDPVR115R55M
127	5"	35	8×16	4×16, 4×14	-	4	12.6	58WDPVR127R55M

Reaming bit integration model



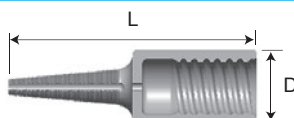
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
152	6"	35	9×14	11×14	3	1	11.0	WI58WDP152R-D

Male / Female drill tube



Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
ST58 - ST58	77	3"	1525	5'	34.0	GR77WD58MF-1525
			1830	6'	40.3	GR77WD58MF-1830

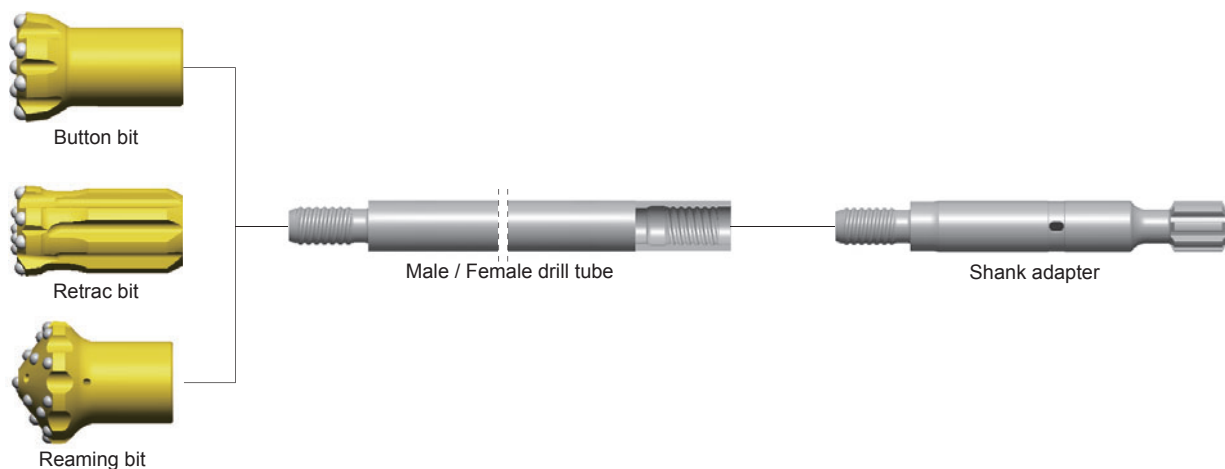
Recovery pike



Outside diameter(D)		Length(L)		Weight [Kg]	Part number
[mm]	[in]	[mm]	[in]		
78	3"	260	10 1/4"	3.4	FTM-58WD-GR78

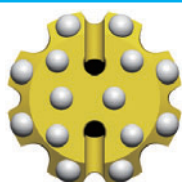
TUBE DRILLING EQUIPMENT

ST68 (2 3/4") SERIES (Recommended gauge diameter Ø102 - Ø127)



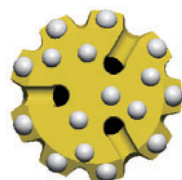
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST
For details of bit design, please refer to p.16

Button bit Type 25



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	35	8×14	6×13	-	2	5.8	68WDPVS102R25M
115	4 1/2"	35	8×14	7×13	-	2	7.8	68WDPVS115R25M
127	5"	35	8×16	8×14	-	2	10.2	68WDPVS127R25M

Button bit Type 23



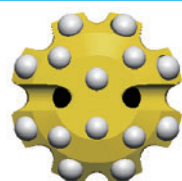
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	35	9×13	6×13	-	3	5.8	68WDPVS102R23M
115	4 1/2"	35	9×13	7×13	-	3	7.8	68WDPVS115R23MS
115	4 1/2"	35	9×14	7×14	-	3	7.9	68WDPVS115R23M
127	5"	35	9×14	7×14	-	3	10.2	68WDPVS127R23MS
127	5"	35	9×16	7×16	-	3	10.3	68WDPVS127R23M

Button bit Type 55



Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	35	8×14	6×14	-	4	5.7	68WDPVS102R55M
115	4 1/2"	35	8×14	8×14	-	4	7.7	68WDPVS115R55M
127	5"	35	8×16	4×16, 4×14	-	4	10.1	68WDPVS127R55M

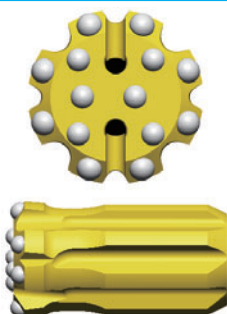
Button bit Type 85



Gauge diameter		* Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	20-40	8×12	7×12	-	2	5.6	68WDPVS102BB85H
115	4 1/2"	20-40	8×14	8×12	-	2	7.6	68WDPVS115BB85H
127	5"	20-40	8×14	4×14, 4×12	-	2	10.0	68WDPVS127BB85H

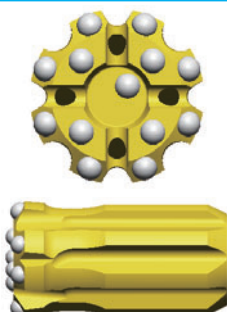
* Face angle 20°, Gauge angle 40°

Retrac Button bit Type 25



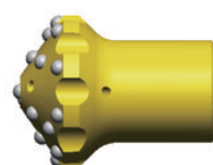
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	35	8×14	6×13	-	2	6.6	68WDPVR102R25M
115	4 1/2"	35	8×14	7×13	-	2	9.4	68WDPVR115R25M
127	5"	35	8×16	8×14	-	2	12.1	68WDPVR127R25M

Retrac Button bit Type 55



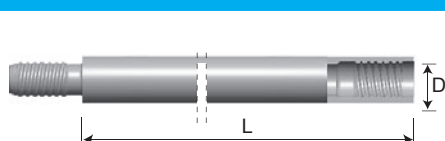
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
102	4"	35	8×14	6×14	-	4	6.4	68WDPVR102R55M
115	4 1/2"	35	8×14	8×14	-	4	9.2	68WDPVR115R55M
127	5"	35	8×16	4×16, 4×14	-	4	11.8	68WDPVR127R55M

Reaming bit integration model



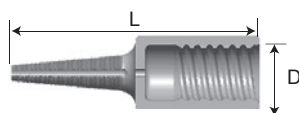
Gauge diameter		Gauge angle [°]	Button × Button dia.[mm]		Flushing hole		Weight [Kg]	Part number
[mm]	[in]		Gauge	Face	Side	Face		
152	6"	35	9×14	11×14	3	1	11.2	WI68WDP152R-D

Male / Female drill tube



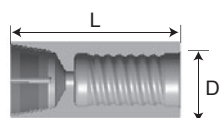
Thread	Outside diameter(D)		Length(L)		Weight [Kg]	Part number
	[mm]	[in]	[mm]	[ft/in]		
ST68 - ST68	87	3 1/2"	1525	5'	39.8	GR87WD68MF-1525
	87	3 1/2"	1830	6'	47.3	GR87WD68MF-1830

Recovery pike



Outside diameter(D)		Length(L)		Weight [Kg]	Part number
[mm]	[in]	[mm]	[in]		
88	3 1/2"	260	10 1/4"	6.2	FTM-68WD-GR88

Recovery sleeve



Outside diameter(D)		Length(L)		Weight [Kg]	Part number
[mm]	[in]	[mm]	[in]		
100	4"	225	8 7/8"	7.5	FTF-68WD-GR88

SHANK ADAPTER

SHANK ADAPTER

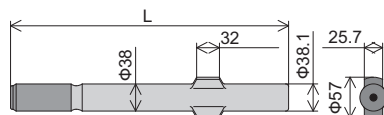
ATLAS COPCO	58
FURUKAWA	62
GARDNER DENVER	65
INGERSOLL RAND	66
MONTABERT	68
SANDVIK / TAMROCK	69
SECOMA	73
TOYO	74



SHANK ADAPTER

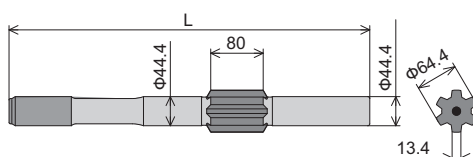
ATLAS COPCO

BBC 54, BBC 120



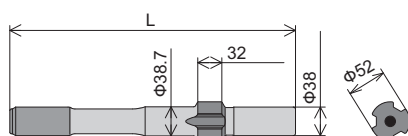
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R32	380	10	3.1	S32R32CBC
T38	390	10	3.3	S32M38BD
R38	390	10	3.3	S32R38DBD

BBE 57



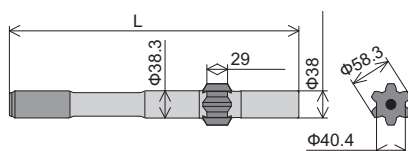
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R38	447	14	5.0	S58R38AB
T38	537	14	5.8	S58M38AD
T45	550	14	7.0	S58M45AE

COP 125, COP 130, COP 131



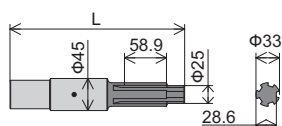
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R32	380	14	2.7	S64R32CAA
T38	380	14	2.9	S64M38AA
T45	380	14	3.9	S64M45AA

COP 131EB



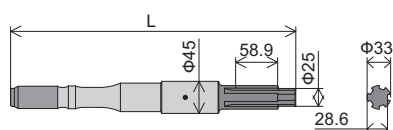
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	405	14	3.3	S190M38AA

COP 1028 Female thread



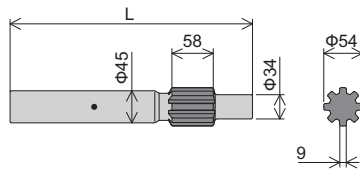
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R25F	245	SF	1.8	S100R25FSFB
R28F	245	SF	1.7	S100R28FSFB

COP 1028



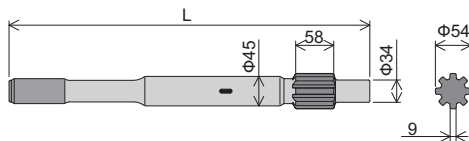
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R28	400	SF	2.8	S100R28SFA
R32	400	SF	3.0	S100R32CSFA

COP 1032 Female thread



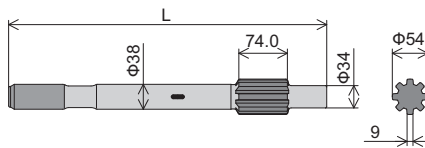
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R28F	340	SF	3.4	S87R28FSFA
R32F	340	SF	3.6	S87R32FSFA

COP 1032



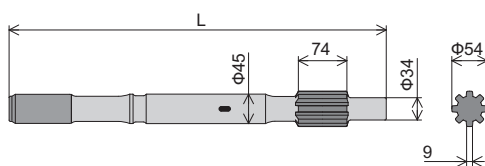
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R28	550	SF	4.8	S87R28SFD
R32	550	SF	5.0	S87R32SFD
T38	550	SF	5.3	S87M38SFD

COP 1036, COP 1038, COP 1238



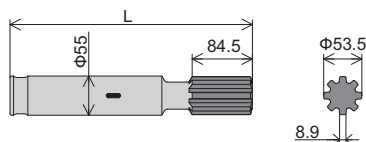
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	485	SF	4.0	S80R32SFB
R38	485	SF	4.3	S80R38SFB
T38	485	SF	4.3	S80M38SFB
R32	500	SF	4.1	S80R32CSFCG
T38	500	SF	4.4	S80M38SFC
R32	575	SF	4.7	S80R32SFEGZ
R38	575	SF	5.0	S80R38SFEGZ
T38	575	SF	5.0	S80M38SFEGZ

COP 1036, COP 1038, COP 1238



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	575	SF	5.2	S80R32ZSFEGZ
R38	575	SF	5.5	S80R38ZSFEGZ
T38	575	SF	5.5	S80M38ZSFEGZ
T45	575	SF	6.5	S80M45SFEGZ

COP 1432, COP 1532 Female thread

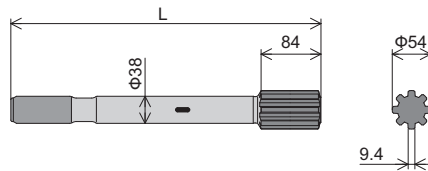


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32F	340	SF	4.3	S285R32FSFA
R38F	340	SF	4.5	S285R38FSFA

SHANK ADAPTER

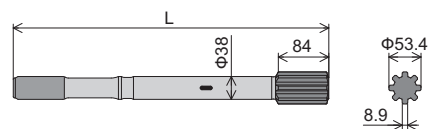
ATLAS COPCO

COP 1440, COP 1550, COP 1638, COP 1838, COP 2238



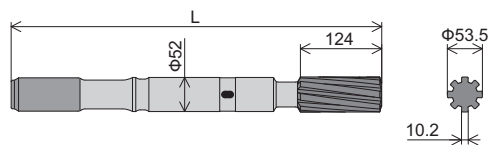
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	435	SF	3.8	S48R32SFAG
R38	435	SF	4.0	S48R38SFAG
T38	435	SF	4.0	S48M38SFAG
R32	525	SF	4.3	S48R32SFBG
R38	525	SF	4.5	S48R38SFBG
T38	525	SF	4.5	S48M38SFBG

COP 1638, COP 1838AW



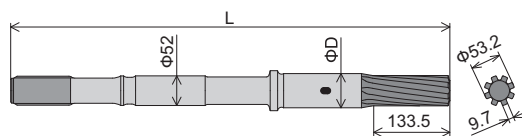
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	525	SF	4.3	S316R32SFA
T38	525	SF	4.5	S316M38SFA

COP 1840



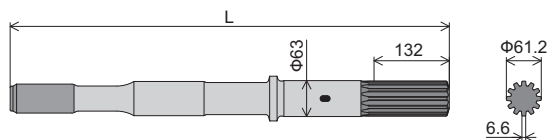
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	565	SF	5.8	S293M45SFA
T51	565	SF	7.3	S293M51SFA

COP 1840 Extractor, 2150 Extractor, 2550 Extractor



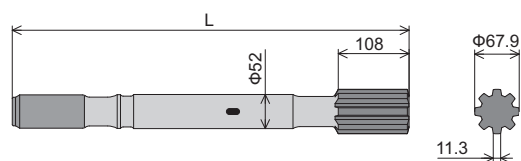
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	770	SF	11.2	S301M45SFAG
T51	770	SF	12.7	S301M51SFAG

COP 2160 Extractor, COP 2560 Extractor



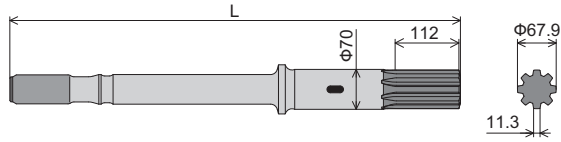
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	770	SF	13.1	S312M45SFA
T51	770	SF	14.6	S312M51SFA

COP 4050 (L)



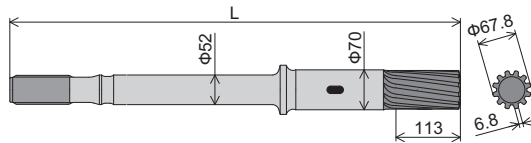
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	605	SF	9.3	S334M51SFA

COP 4050 Extractor



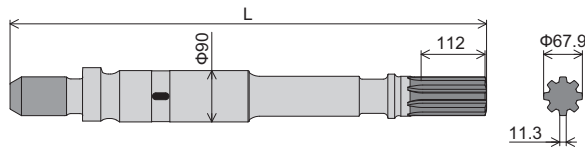
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	790	SF	16.0	S343M51SFAG

COP 4050 Extractor



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	790	SF	15.0	S299M51SFAG

COP 4050MUX

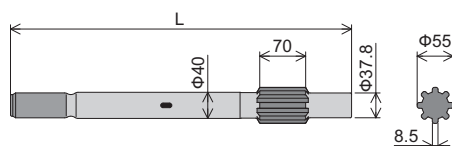


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
ST58	835	SF	26.0	S284WD58SFAG
ST68	835	SF	27.0	S284WD68SFAG

SHANK ADAPTER

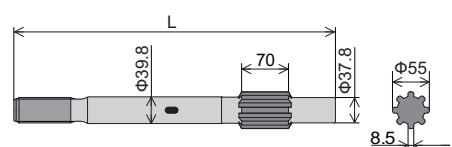
FURUKAWA

HD 150



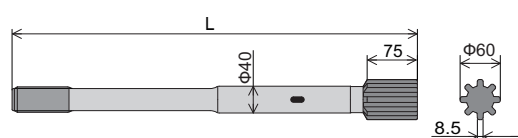
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R38	520	SF	5.0	S110R38SFAG
T38	520	SF	5.0	S110M38SFAG

HD 190



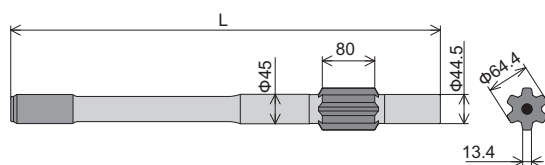
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R38	480	SF	4.6	S166R38SFAG
T38	480	SF	4.6	S166M38SFAG

HD 210



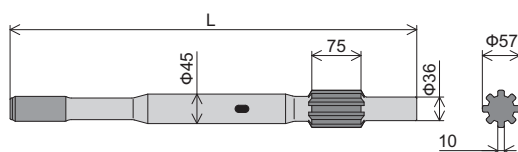
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R38	605	SF	5.9	S244R38SFAG
T38	605	SF	5.9	S244M38SFAG

HD 300



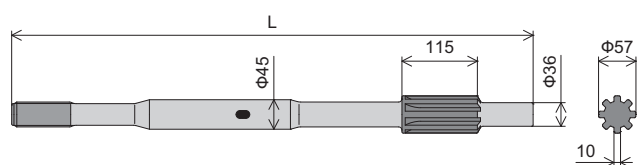
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	655	16	6.1	S62M38AA
T45	655	16	6.8	S62M45AA

HD 609



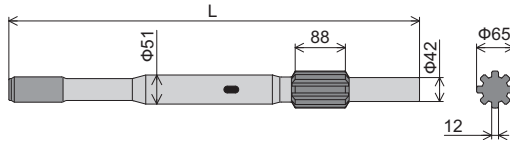
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	620	SF	5.7	S142M38SFAG
T45	620	SF	6.4	S142M45SFA
T38	690	SF	6.4	S142M38SFB

HD 609RP



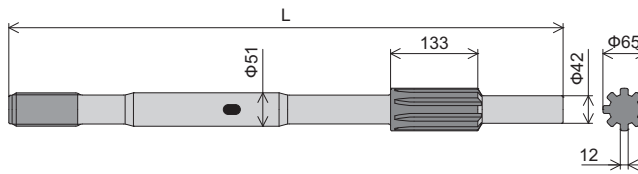
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	795	SF	7.7	S116R32SFAG
T38	795	SF	7.9	S116M38SFAG
T45	795	SF	8.3	S116M45SFAG
T38	865	SF	8.4	S116M38SFBG
T45	865	SF	8.8	S116M45SFBG

HD 612



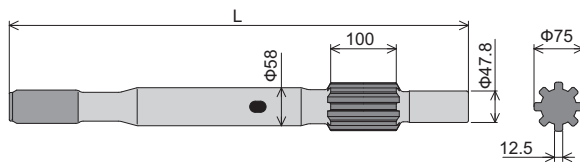
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	720	SF	9.2	S173M45SFA

HD 612RP



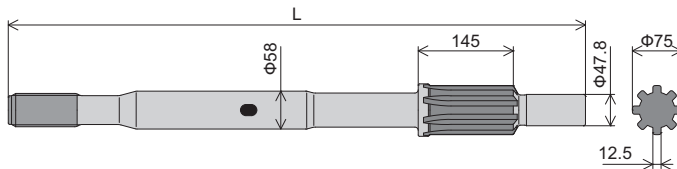
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	845	SF	10.6	S117M38SFAG
T45	845	SF	11.0	S117M45SFAG
T51	845	SF	11.4	S117M51SFAG
T45	880	SF	11.4	S117M45SFCG
T45	885	SF	11.5	S117M45SFBG

HD 615



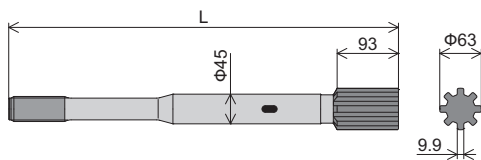
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	700	SF	10.7	S123M45SFA
T51	700	SF	11.7	S123M51SFAG

HD 615RP



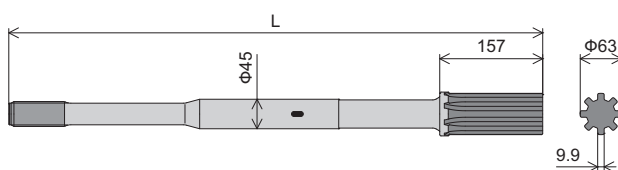
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	880	SF	14.7	S126M51SFAG

HD 709



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	591	SF	6.2	S237M38SFAG
T45	591	SF	6.8	S237M45SFAG
T38	620	SF	6.5	S237M38SFBG
T45	620	SF	7.0	S237M45SFBG

HD 709RP

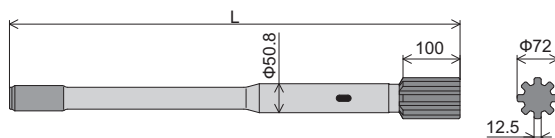


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	785	SF	9.2	S245M45SFBG
T38	814	SF	9.1	S245M38SFAG
T45	814	SF	9.5	S245M45SFAG

SHANK ADAPTER

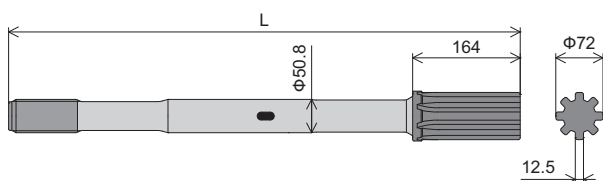
FURUKAWA

HD 712



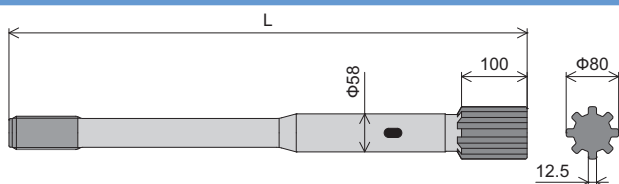
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	790	SF	9.9	S222M45SFBG

HD 712RP



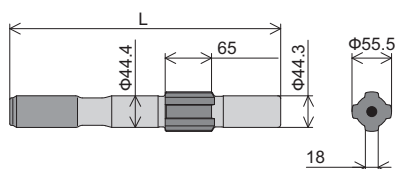
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	787	SF	11.6	S221M38SFAG
T45	787	SF	11.9	S221M45SFAG
T51	787	SF	12.5	S221M51SFAG
T45	885	SF	12.7	S221M45SFBG
T51	885	SF	13.4	S221M51SFBG

HD 715



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	790	SF	12.7	S238M51SFAG

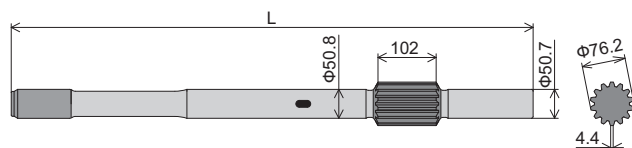
M 120 and PD 200



Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	380	14	3.6	S51M38AB
T38	446	14	3.9	S51M38AG

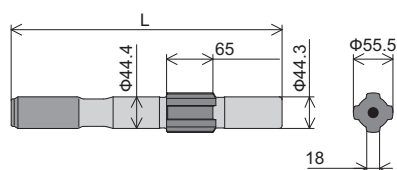
GARDNER DENVER

HPR 2



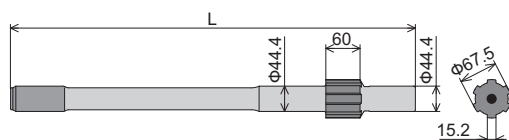
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	915	SF	14.3	S267M51SFA

PR 123



Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R32	380	14	3.8	S51R32AB
R38	380	14	3.6	S51R38AB
T38	380	14	3.6	S51M38AB
T45	380	14	4.6	S51M45AB

PR 66

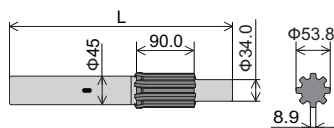


Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	710	16	4.8	S75M38AA
T45	710	16	5.8	S75M45AA

SHANK ADAPTER

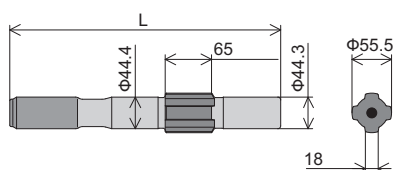
INGERSOLL RAND

Hydrastar 200 Female thread



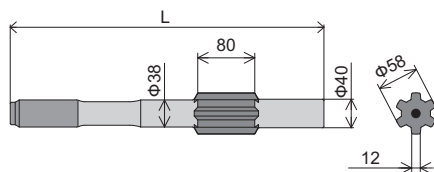
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32F	351	SF	3.2	S109R32FSFA

URD 475, URD 550, VL120, VL140, F16



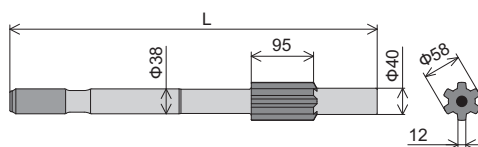
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R32	380	14	3.8	S51R32AB
R38	380	14	3.6	S51R38AB
T38	380	14	3.6	S51M38AB
T45	380	14	4.4	S51M45AB
T38	446	14	3.9	S51M38AG

YH 50, YH 55



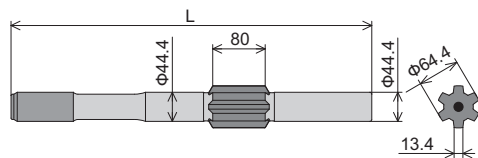
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	440	16	3.8	S84M38AA

YH 50 RP, YH55RP



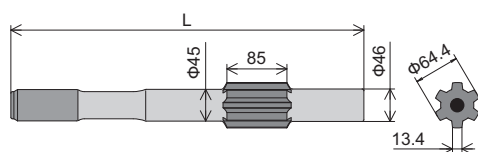
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	560	16	5.1	S06M38AB

YH 60A



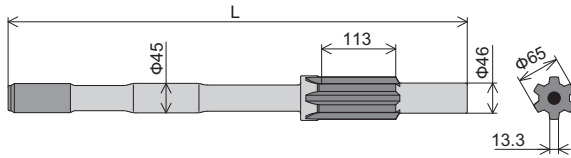
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	537	14	5.8	S58M38AD

YH 65, YH 70, YH 80



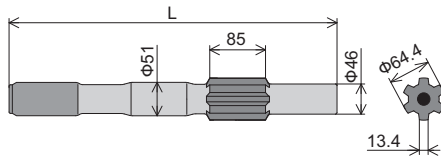
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	480	19	4.7	S63M38AB
T45	480	19	5.5	S63M45AB
T38	500	19	4.9	S63M38AC
T45	500	19	5.7	S63M45AC

YH 65 RP, YH 70 RP, YH 80 RP



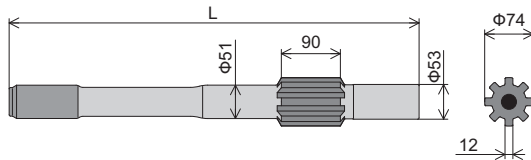
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	700	19	8.0	S25M38AA
T45	700	19	9.0	S25M45AA

YH 80A



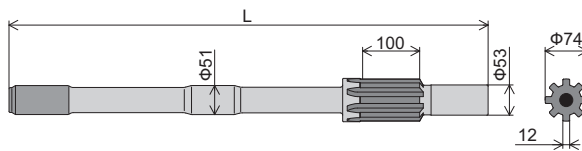
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T45	495	19	6.0	S198M45AA
T51	500	19	6.4	S198M51AB

YH 95, YH 100



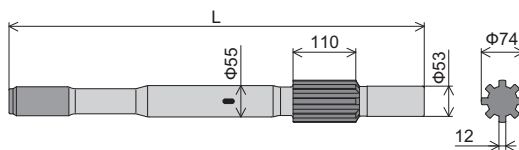
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T51	625	23	8.8	S09M51AA

YH 95 RP, YH 100 RP



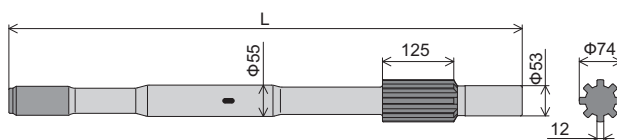
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T51	840	23	11.8	S03M51AA

YH 110 V, YH 135



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	728	SF	11.6	S127M45SFAG
T51	728	SF	12.0	S127M51SFAG

YH 110 VRP, Y 135 RP

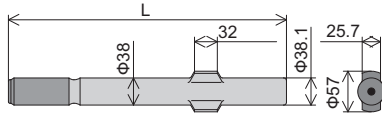


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	900	SF	14.8	S128M51SFAG

SHANK ADAPTER

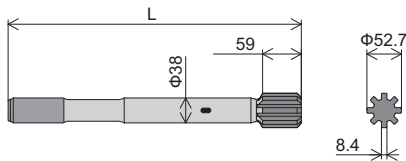
MONTABERT

H 50, H 60, H 70



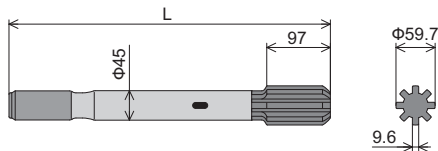
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
R32	380	10	3.1	S32R32CBC
R38	390	10	3.3	S32R38DBD
T38	390	10	3.3	S32M38BD

HC 40, HC 50



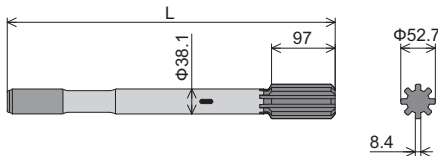
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	372	SF	3.0	S77R32SFDG
R38	372	SF	3.2	S77R38CSFDG
T38	372	SF	3.2	S77M38SFDG
T38	447	SF	3.6	S77M38SFCG

HC 80, HC 120



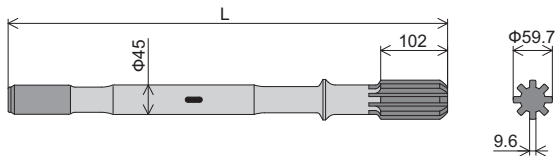
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	490	SF	6.2	S209M45SFAG

HC 80, HC 90, HC 105, HC 120



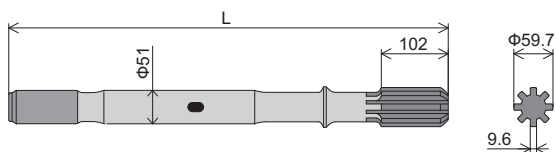
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	440	SF	3.6	S73R32SFBG
R38	440	SF	4.0	S73R38DSFBG
T38	440	SF	4.0	S73M38SFBG
T38	500	SF	4.3	S73M38SFAG

HC 80 RP, HC 105 RP, HC 107 RP, HC 108 RP, HC 109 RP



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	670	SF	7.4	S70M38SFAG
T45	670	SF	8.2	S70M45SFAG

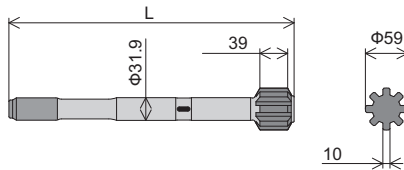
HC 120 RP, HC 150 RP, HC 155 RP, HC 158 RP



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	670	SF	9.9	S206M51SFAG

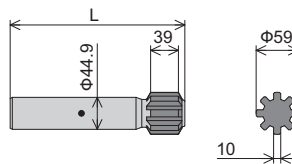
SANDVIK / TAMROCK

HL 300



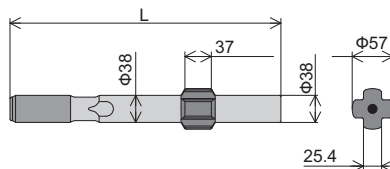
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	400	SF	2.7	S292R32SFAG

HL 300S Female thread



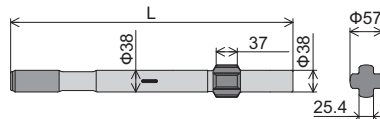
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32F	245	SF	2.6	S150R32FSFAG

HL 438, HL 538, HL 438L, HL 438T



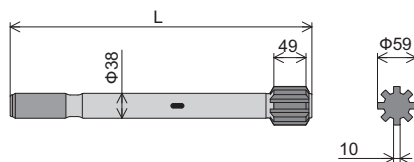
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	380	12.7	3.3	S39M38AA
T38	400	12.7	3.4	S39M38AJG

HL 438LS, 438TS, HL538, HL538L, L550S



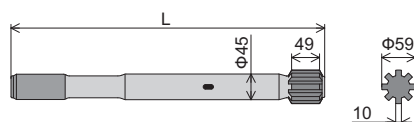
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	450	SF	3.9	S39R32SFDG
R38	450	SF	4.1	S39R38SFDG
T38	455	SF	4.2	S39M38SFDG
T38	495	SF	4.4	S39M38SFGG

HL 500-38, HL 510-38, HL 500S-38, HL 510S-38, HL 510B, HL 510LH



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	460	SF	3.8	S12R32SFAG
R38	460	SF	4.1	S12R38SFAG
T38	460	SF	4.1	S12M38SFAG
R38	500	SF	4.4	S12R38DSFDZ
R32	550	SF	4.4	S12R32SFBG
R38	550	SF	4.8	S12R38DSFBG
T38	550	SF	4.8	S12M38SFBG

HL 500-45, HL 510-45

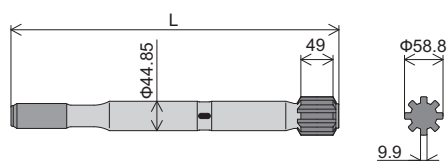


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	550	SF	5.8	S12M38ZSFBG
T45	550	SF	6.1	S12M45ZSFBG

SHANK ADAPTER

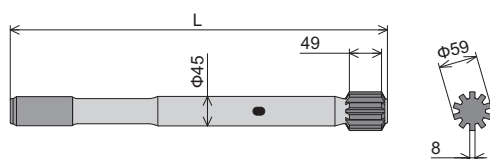
SANDVIK / TAMROCK

HL 550 SUPER, 560 SUPER, 510S-45



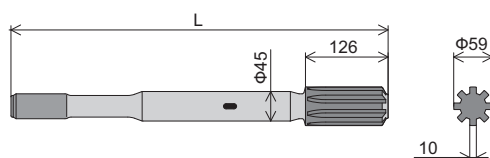
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R38	500	SF	5.4	S155R38SFAG
T38	500	SF	5.4	S155M38SFAG

HLX5, HLX5T



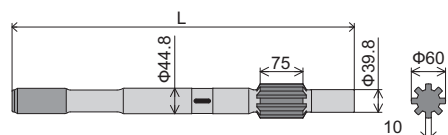
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R38	500	SF	5.4	S268R38SFAG
T38	500	SF	5.4	S268M38SFAG
T38	575	SF	5.9	S268M38SFBG

HLX5 PE-45



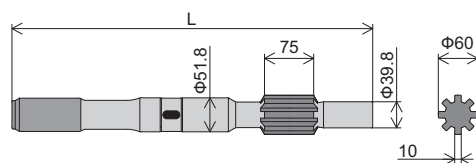
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32	575	SF	6.1	S330R32SFAG
T38	575	SF	6.3	S330M38SFAG

HL 600-45, HL 600S-45



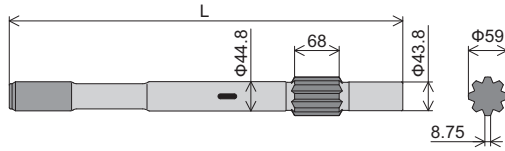
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	525	SF	5.5	S17M38SFCG
T45	525	SF	6.0	S17M45SFCG
R32	600	SF	6.1	S17R32CSFAG
T38	600	SF	6.3	S17M38SFAG
T45	600	SF	7.1	S17M45SFAG

HL 600-52



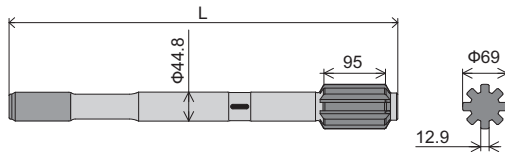
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	650	SF	8.5	S215M51SFA

HL 645



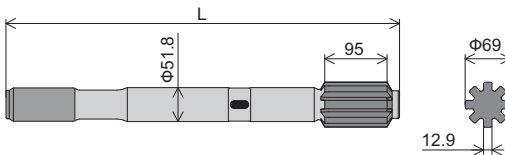
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	600	SF	8.1	S69M45SFAG

HL 650-45, 700-45, 700T-45, 710-45, 800T-45



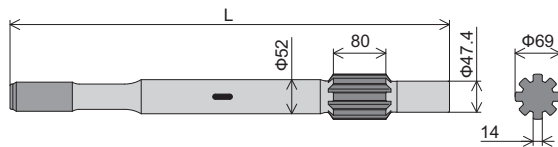
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	600	SF	7.5	S240M45SFAG

HL 650-52, 700-52, PE-52, S-52, 710-52, SPE-52, 800T-52



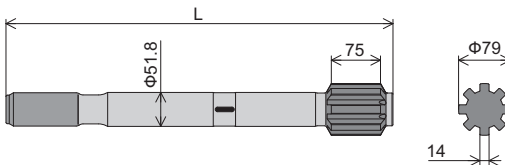
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	600	SF	8.4	S196M38SFAG
T45	600	SF	8.8	S196M45SFAG
T51	600	SF	9.1	S196M51SFAG

HL 850S



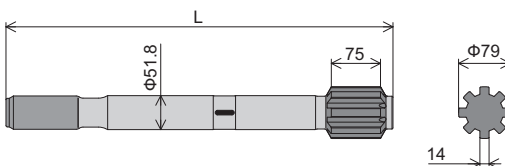
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	670	SF	9.8	S60M45SFB

HL 1000-52, 1000 S-52



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	590	SF	8.6	S13M45SFAG
T51	590	SF	9.4	S13M51SFAG

HL 1000-52, 1000 S-52

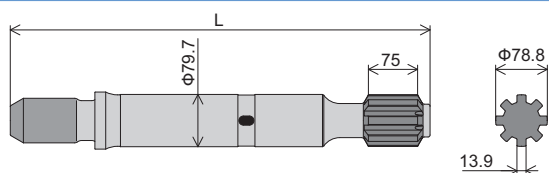


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T45	670	SF	10.3	S13M45SFBG
T51	670	SF	11.1	S13M51SFBG

SHANK ADAPTER

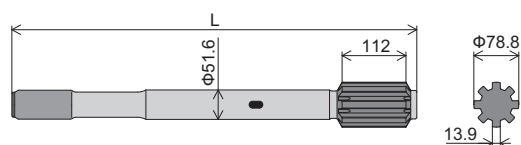
SANDVIK / TAMROCK

HL 1000 S-80 Tube drilling



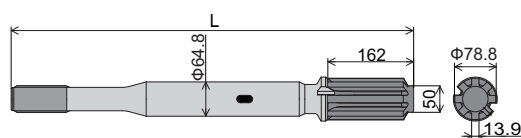
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
ST58	623	SF	18.2	S258WD58SFAG
ST68	640	SF	19.0	S258WD68SFAG

HL 1500-52 ,1500 T-52



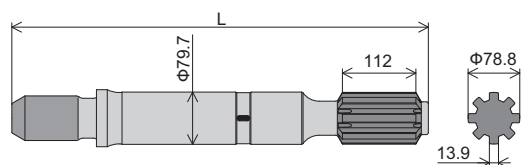
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	710	SF	11.5	S283M51SFBG

HL1500-PE



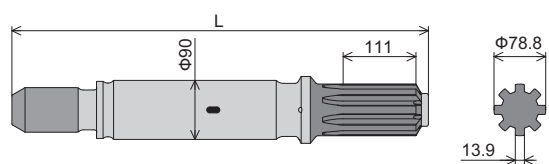
Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T51	760	SF	18.2	S298M51SFAG

HL 1500 S-80 Tube drilling



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
ST58	635	SF	17.6	S283WD58SFAG
ST68	635	SF	18.6	S283WD68SFAG

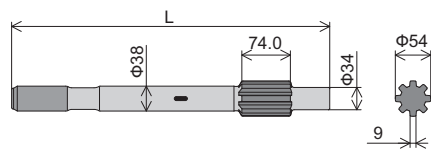
HL 1500 SPE-90 Tube drilling



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
ST58	635	SF	21.6	S332WD58SFAG
ST68	635	SF	22.6	S332WD68SFAG

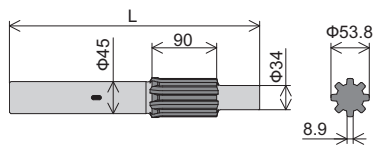
SECOMA

Hydrastar 200, Hydrastar 350, Hydrastar 300, Hydrastar X2



Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
T38	485	SF	4.0	S80M38SFB
R32	485	SF	4.3	S80R32SFB
R38	485	SF	4.3	S80R38SFB
T38	500	SF	4.1	S80M38SFC
R32	500	SF	4.4	S80R32CSFCG

Hydrastar 350 Female thread

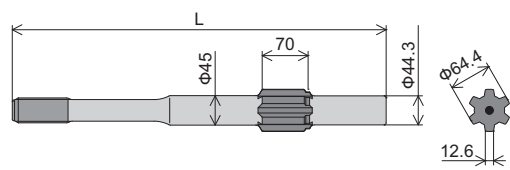


Thread	Length(L) [mm]	Flushing tube dia	Weight [Kg]	Part number
R32F	351	SF	3.2	S109R32FSFA

SHANK ADAPTER

TOYO

TH500, TH550



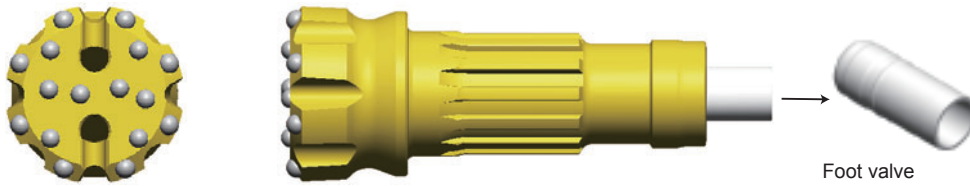
Thread	Length(L) [mm]	Flushing tube dia [mm]	Weight [Kg]	Part number
T38	570	12	5.9	S57M38AB



DOWN THE HOLE BIT



DOWN THE HOLE BIT



Flat face design R25 For drilling in a medium-hard to hard and abrasive rock.	Concave design R65 The all-round application bit specifically designed for medium hard and homogeneous rock formations. Excellent hole deviation control and flushing volume.	Convex design BB81 Bit design with excellent flushing volume. For drilling at high penetration rates in non-abrasive rock.

Ingersoll-Rand

Hammer model	Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole	Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face			
DHD3.5	90	3 1/2"	30	8×12	5×12	2	4.7	DH3.5P90R25
	95	3 3/4"	30	8×12	6×12	2	4.8	DH3.5P95R25
	100	3 15/16"	35	8×14	7×12	2	4.9	DH3.5P100R25
	102	4"	35	8×14	7×12	2	4.9	DH3.5P102R25
	90	3 1/2"	※ 20 - 40	6×12	6×12	2	4.7	DH3.5P90BB81
	95	3 3/4"	20 - 40	6×12	6×12	2	4.8	DH3.5P95BB81
	100	3 15/16"	20 - 40	6×12	6×12	2	4.9	DH3.5P100BB81
	102	4"	20 - 40	6×12	6×12	2	4.9	DH3.5P102BB81
Foot valve				-				FV-DH3.5
DHD340	105	4 1/8"	35	8×14	7×12	2	8.6	DH340P105R25
	110	4 5/16"	35	8×14	7×12	2	8.7	DH340P110R25
	115	4 1/2"	35	8×14	8×12	2	9.0	DH340P115R25
	120	4 3/4"	35	8×14	8×12	2	9.7	DH340P120R25
	127	5"	35	8×16	7×14	2	10.6	DH340P127R25
	105	4 1/8"	※ 20 - 40	8×12	8×12	2	8.6	DH340P105BB81
	110	4 5/16"	20 - 40	8×12	8×12	2	8.7	DH340P110BB81
	115	4 1/2"	20 - 40	8×12	8×12	2	9.0	DH340P115BB81
	120	4 3/4"	20 - 40	8×14	8×14	2	9.7	DH340P120BB81
	127	5"	20 - 40	8×14	8×14	2	10.6	DH340P127BB81
Foot valve				-				FV-DHD340
DHD350	133	5 1/4"	35	8×16	8×14	2	16.0	DH350P133R25
	140	5 1/2"	35	8×16	9×14	2	16.4	DH350P140R25
	146	5 3/4"	35	8×19	8×16	2	16.8	DH350P146R25
	152	6"	35	8×19	10×16	2	18.1	DH350P152R25
	133	5 1/4"	20 - 40	8×14	8×14	2	16.0	DH350P133BB81
	140	5 1/2"	20 - 40	8×14	10×14	2	16.4	DH350P140BB81
	146	5 3/4"	20 - 40	8×14	10×14	2	16.8	DH350P146BB81
	152	6"	20 - 40	8×14	10×16	2	18.1	DH350P152BB81
Foot valve				-				FV-DHD350

※ Face angle 20°, Gauge angle 40°

Hammer model	Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole	Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face			
DHD360	152	6"	35	8×19	10×16	2	24.0	DH360P152R65
	156	6 1/8"	35	8×19	10×16	2	24.4	DH360P156R65
	159	6 1/4"	35	8×19	10×16	2	24.6	DH360P159R65
	165	6 1/2"	35	8×19	10×16	2	24.8	DH360P165R65
	171	6 3/4"	35	10×19	12×16	2	25.4	DH360P171R65
	178	7"	35	10×19	12×16	2	26.1	DH360P178R65
	191	7 1/2"	35	10×19	16×16	2	26.6	DH360P191R65
	* 200	7 7/8"	35	10×19	16×16	2	29.5	DH360P200R65
	* 203	8"	35	10×19	16×16	2	29.9	DH360P203R65
	* 216	8 1/2"	35	12×19	18×16	2	35.0	DH360P216R65
	Foot valve							FV-DHD360
DHD380	203	8"	35	10×19	16×16	2	49.5	DH380P203R65
	216	8 1/2"	35	12×19	18×16	2	52.7	DH380P216R65
	230	9"	35	12×19	19×16	2	53.3	DH380P230R65
	* 254	10"	35	12×19	24×16	2	54.0	DH380P254R65
	Foot valve							FV-DHD380
QL40	105	4 1/8"	35	8×14	7×12	2	8.6	QL40P105R25
	110	4 5/16"	35	8×14	7×12	2	8.7	QL40P110R25
	115	4 1/2"	35	8×14	8×12	2	9.0	QL40P115R25
	120	4 3/4"	35	8×14	8×12	2	9.7	QL40P120R25
	127	5"	35	8×16	7×14	2	10.6	QL40P127R25
	105	4 1/8"	※ 20 - 40	8×12	8×12	2	8.6	QL40P105BB81
	110	4 5/16"	20 - 40	8×12	8×12	2	8.7	QL40P110BB81
	115	4 1/2"	20 - 40	8×12	8×12	2	9.0	QL40P115BB81
	120	4 3/4"	20 - 40	8×14	8×14	2	9.7	QL40P120BB81
	127	5"	20 - 40	8×14	8×14	2	10.6	QL40P127BB81
	Foot valve							FV-QL40
QL50	133	5 1/4"	35	8×16	8×14	2	16.0	QL50P133R25
	140	5 1/2"	35	8×16	9×14	2	16.4	QL50P140R25
	146	5 3/4"	35	8×19	8×16	2	16.8	QL50P146R25
	152	6"	35	8×19	10×16	2	18.1	QL50P152R25
	133	5 1/4"	※ 20 - 40	8×14	8×14	2	16.0	QL50P133BB81
	140	5 1/2"	20 - 40	8×14	10×14	2	16.4	QL50P140BB81
	146	5 3/4"	20 - 40	8×14	10×14	2	16.8	QL50P146BB81
	152	6"	20 - 40	8×16	10×16	2	18.1	QL50P152BB81
	Foot valve							FV-QL50
QL60	152	6"	35	8×19	10×16	2	24.0	QL60P152R65
	156	6 1/8"	35	8×19	10×16	2	24.4	QL60P156R65
	159	6 1/4"	35	8×19	10×16	2	24.6	QL60P159R65
	165	6 1/2"	35	8×19	10×16	2	24.8	QL60P165R65
	171	6 3/4"	35	10×19	12×16	2	25.4	QL60P171R65
	178	7"	35	10×19	12×16	2	26.1	QL60P178R65
	191	7 1/2"	35	10×19	16×16	2	26.6	QL60P191R65
	* 200	7 7/8"	35	10×19	16×16	2	29.5	QL60P200R65
	* 203	8"	35	10×19	16×16	2	29.9	QL60P203R65
	* 216	8 1/2"	35	12×19	18×16	2	35.0	QL60P216R65
	Foot valve							FV-QL60
QL80	203	8"	35	10×19	16×16	2	49.5	QL80P203R65
	216	8 1/2"	35	12×19	18×16	2	52.7	QL80P216R65
	230	9"	35	12×19	19×16	2	53.3	QL80P230R65
	* 254	10"	35	12×19	24×16	2	54.0	QL80P254R65
	Foot valve							FV-QL80

※ Face angle 20°, Gauge angle 40°

* No shank breakage warranty

DOWN THE HOLE BIT

Sandvik

Hammer model	Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole	Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face			
SD4	105	4 1/8"	35	8×14	7×12	2	8.6	SD4P105R25
	110	4 5/16"	35	8×14	7×12	2	8.7	SD4P110R25
	115	4 1/2"	35	8×14	8×12	2	9.0	SD4P115R25
	120	4 3/4"	35	8×14	8×12	2	9.7	SD4P120R25
	127	5"	35	8×16	7×14	2	10.6	SD4P127R25
	105	4 1/8"	※ 20 - 40	8×12	8×12	2	8.6	SD4P105BB81
	110	4 5/16"	20 - 40	8×12	8×12	2	8.7	SD4P110BB81
	115	4 1/2"	20 - 40	8×12	8×12	2	9.0	SD4P115BB81
	120	4 3/4"	20 - 40	8×14	8×14	2	9.7	SD4P120BB81
	127	5"	20 - 40	8×14	8×14	2	10.6	SD4P127BB81
	Foot valve							FV-SD4
SD5	133	5 1/4"	35	8×16	8×14	2	16.0	SD5P133R25
	140	5 1/2"	35	8×16	9×14	2	16.4	SD5P140R25
	146	5 3/4"	35	8×19	8×16	2	16.8	SD5P146R25
	152	6"	35	8×19	10×16	2	18.1	SD5P152R25
	133	5 1/4"	※ 20 - 40	8×14	8×14	2	16.0	SD5P133BB81
	140	5 1/2"	20 - 40	8×14	10×14	2	16.4	SD5P140BB81
	146	5 3/4"	20 - 40	8×14	10×14	2	16.8	SD5P146BB81
	152	6"	20 - 40	8×16	10×16	2	18.1	SD5P152BB81
	Foot valve							FV-SD5
SD6	152	6"	35	8×19	10×16	2	24.0	SD6P152R65
	156	6 1/8"	35	8×19	10×16	2	24.4	SD6P156R65
	159	6 1/4"	35	8×19	10×16	2	24.6	SD6P159R65
	165	6 1/2"	35	8×19	10×16	2	24.8	SD6P165R65
	171	6 3/4"	35	10×19	12×16	2	25.4	SD6P171R65
	178	7"	35	10×19	12×16	2	26.1	SD6P178R65
	191	7 1/2"	35	10×19	16×16	2	26.6	SD6P191R65
	* 200	* 7 7/8"	35	10×19	16×16	2	29.5	SD6P200R65
	* 203	* 8"	35	10×19	16×16	2	29.9	SD6P203R65
	* 216	* 8 1/2"	35	12×19	18×16	2	35.0	SD6P216R65
	Foot valve							FV-SD6
SD8	203	8"	35	10×19	16×16	2	49.5	SD8P203R65
	216	8 1/2"	35	12×19	18×16	2	52.7	SD8P216R65
	230	9"	35	12×19	19×16	2	53.3	SD8P230R65
	* 254	* 10"	35	12×19	24×16	2	54.0	SD8P254R65
	Foot valve							FV-SD8

※ Face angle 20°, Gauge angle 40°

* No shank breakage warranty

Atlas Copco

Hammer model	Gauge diameter		Gauge angle [°]	Button × Button dia. [mm]		Flushing hole	Weight [Kg]	Part number
	[mm]	[in]		Gauge	Face			
COP32	90	3 1/2"	30	8×12	5×12	2	4.7	COP32P90R25
	95	3 3/4"	30	8×12	6×12	2	4.8	COP32P95R25
	100	3 15/16"	35	8×14	7×12	2	4.9	COP32P100R25
	102	4"	35	8×14	7×12	2	4.9	COP32P102R25
	90	3 1/2"	※ 20 - 40	6×12	6×12	2	4.7	COP32P90BB81
	95	3 3/4"	20 - 40	6×12	6×12	2	4.8	COP32P95BB81
	100	3 15/16"	20 - 40	6×12	6×12	2	4.9	COP32P100BB81
	102	4"	20 - 40	6×12	6×12	2	4.9	COP32P102BB81
COP42	105	4 1/8"	35	8×14	7×12	2	8.6	COP42P105R25
	110	4 5/16"	35	8×14	7×12	2	8.7	COP42P110R25
	115	4 1/2"	35	8×14	8×12	2	9.0	COP42P115R25
	120	4 3/4"	35	8×14	8×12	2	9.7	COP42P120R25
	127	5"	35	8×16	7×14	2	10.6	COP42P127R25
	105	4 1/8"	※ 20 - 40	8×12	8×12	2	8.6	COP42P105BB81
	110	4 5/16"	20 - 40	8×12	8×12	2	8.7	COP42P110BB81
	115	4 1/2"	20 - 40	8×12	8×12	2	9.0	COP42P115BB81
	120	4 3/4"	20 - 40	8×14	8×14	2	9.7	COP42P120BB81
	127	5"	20 - 40	8×14	8×14	2	10.6	COP42P127BB81

※ Face angle 20°, Gauge angle 40°

* No shank breakage warranty

Corporate Social Responsibility For People, Society and the Earth

If you condensed the history of the Earth into the space of one year, human history would last roughly four hours.

Global economic development since the industrial revolution in the 18th century would last just a single second.

That single second is all it has taken for the human race to drastically deplete the natural resources that the planet had built up through the ages.

As a result, the environment is now facing a whole range of issues.

Climate change

Finite natural resources

The fundamental aim of our CSR activities here at the Mitsubishi Materials Group is to help resolve universal issues such as these through our core operations and to put our Corporate Philosophy, "For People, Society and the Earth," into practice.

Our Commitment

These days, we hear reports of abnormal weather conditions from all over the world, including rising sea levels due to the melting of the polar ice caps and disasters caused by phenomena such as hurricanes, cyclones, heavy rains, droughts and heat waves. With more and more international environmental rules coming into effect, we need to take wide-ranging action in order to deal with the problem of climate change, factoring in considerations such as new regulations and frameworks.

As Japan is a resource-poor nation that relies on overseas mining for the majority of its mineral resources, it is crucial that we recycle resources and make effective use of renewable resources in order to minimize consumption of natural resources and reduce environmental impact. With Japan's limited size virtually ruling out the possibility of constructing new landfill sites, recycling is also becoming increasingly important in the interests of reducing waste.

We are committed to tackling issues such as these through our core operations.

- 1) We will comprehensively reduce greenhouse gas emissions and other forms of environmental impact and expand operations aimed at creating a low carbon society, including environmentally friendly products and renewable energy.
- 2) We will collect and recycle more waste and used products and make an even greater contribution to the creation of a recycling-oriented society.
- 3) Through advanced technology and increased efficiency, we will improve resource productivity and manufacture materials and components so as to make the best possible use of natural resources and maintain stable supplies.

Here at the Mitsubishi Materials Group, we are determined to do our bit to help create a sustainable society, based on our Corporate Philosophy "For People, Society and the Earth,"

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IDENTIFY SAFETY HAZARDS

SAFETY FIRST, SAFETY NOW, SAFETY ALWAYS

Carefully read and follow the below safety warnings and instructions prior to engaging in work with equipment.

- Always follow equipment manufacturer's recommendations for safety and maintenance.
- Always wear personal protection equipment, including: steel toed boots, work gloves, safety glasses and hard hat. Be familiar with the safety requirements of your work site.
- Always wear hearing protection when the work environment includes noise levels at or above 85 dBA. Dual hearing may be required when percussion drills are operating.
- Never operate equipment while under the influence of drugs, alcohol, medication or extreme exhaustion.
- Stand clear of all moving and rotating equipment parts. Never wear loose articles of clothing around moving equipment parts.
- Be cautious of other equipment operating around you.
- Always maintain a clean working area.
- Avoid extremely hazardous working conditions.
- Refrain from having unnecessary visitors to your work area. Ensure any visitors are dressed properly for the working conditions they are entering.
- Always use and keep machine safety guards intact and in working order.
- Employ trained and experienced service mechanics to maintain and repair equipment.
- Always follow all local and federal health and safety regulations.
- Prior to moving equipment or operating equipment controls, always be sure of what function they perform. Always know where other persons are prior to moving equipment.
- Never customize or alter the drill or drill string components. Failure to follow this will void any warranties and could cause premature failure to the tool or physical hazards to persons.
- Prior to lifting tools with hoists, make sure that all rope and/or slings are free to move without getting tangled.



mitsubishi MATERIALS CORPORATION

JAPAN / ROCK TOOLS

mitsubishi MATERIALS CORPORATION OVERSEAS OPERATIONS CENTER

KFC bldg., 7F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan

TEL +81-3-5819-8723 FAX +81-3-5819-5259

E-Mail: rocktool@mmc.co.jp

Subsidiaries of MITSUBISHI MATERIALS CORPORATION

U.S.A.	mitsubishi MATERIALS U.S.A. CORPORATION 105 Corporate Center Dr. Suite A, Mooresville, NC 28117, U.S.A TEL +1-980-312-3150 FAX +1-704-746-9595 E-Mail: mmusclt@mmus.com	Australia	mitsubishi MATERIALS TRADING CORPORATION PERTH BRANCH Level1, 468 Belmont Avenue, Kewdale, WA 6105 Australia TEL +61-8-6258-7200 FAX +61-8-6258-5614 E-Mail: info@mmtau.com
Germany	MMC HARTMETALL GMBH Comeniusstr. 2,40670 Meerbusch, Germany TEL +49-2159-9189-32 FAX +49-2159-9189-30079 E-Mail: rocktools@mmchg.de	South Korea	mitsubishi MATERIALS TRADING CORPORATION SEOUL BRANCH #1812, Samsung Cheil Bldg, 309, Teheran-Ro, Gangnam-Gu, Seoul, 06151, Korea TEL +82-2-3474-2331 FAX +82-2-572-2834
Brazil	MMC METAL DO BRASIL LTDA. Rua Cincinato Braga, 340 13º andar. Bela Vista- CEP 01333-010 São Paulo-SP., BRASIL TEL +55-11-3262-5095 FAX +55-11-3285-4906 E-Mail: mmbr@mmbr.com.br	Singapore	mitsubishi MATERIALS TRADING CORPORATION SINGAPORE BRANCH 10 Anson Road, #32-09 International Plaza, 079903 Singapore TEL +65-6221-7233 FAX +65-6325-4220
Mexico	MMC METAL DE MEXICO S.A. DE C.V. Av. La Canada No.16 Parque Industrial Bernardo Quintana El marques, Queretaro. TEL +52-442-221-6136 +52-442-221-6137 FAX +52-442-221-6134 E-Mail: gonzalez@mmcmex.com	China	mitsubishi MATERIALS (Shanghai) CORPORATION Room 3911, UNITED PLAZA 1468, Nanjing Road West, Shanghai, 200040 China TEL +86-21-6235-0745 FAX +86-21-6235-0741

<http://mrt.mitsubishicarbide.com>