

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;

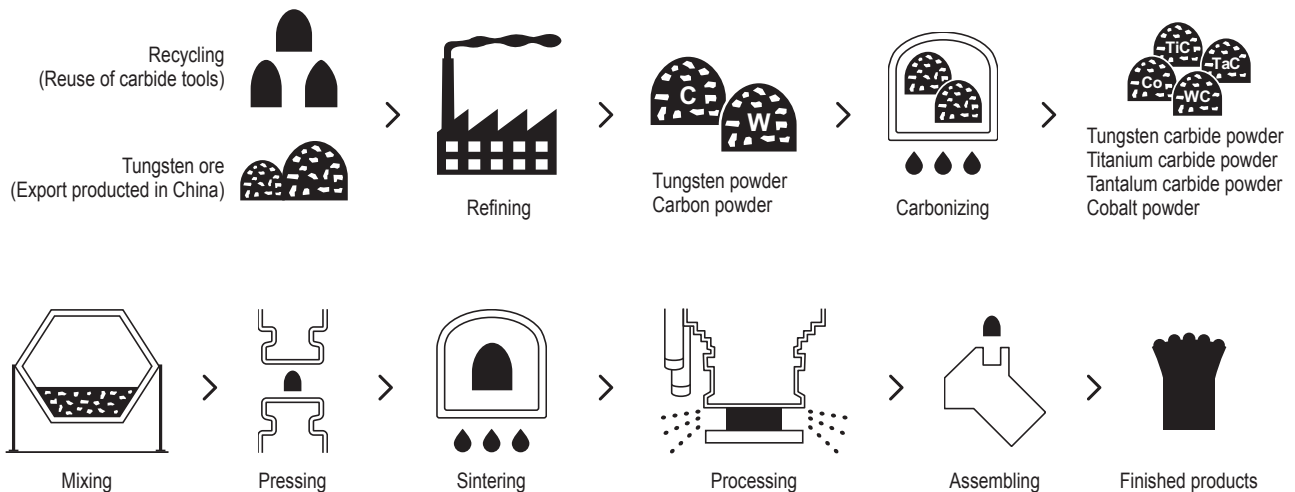
- 1) rock drilling tools, essential for mine excavations and infrastructural development for tunnels and roads, and
- 2) cutting tools for automotive and aerospace machining applications;
- 3) wear resistant tools used as molds for sanitary goods manufacturing, rolls for metal rolling, coating tools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

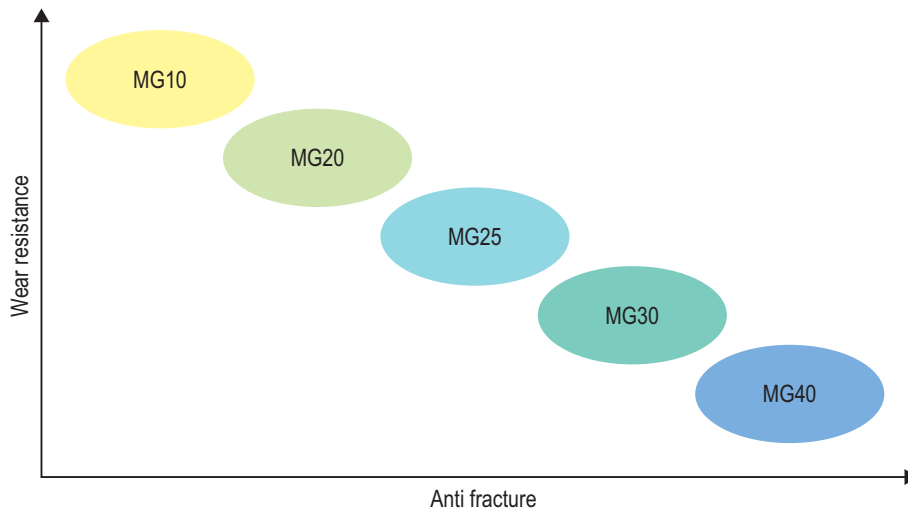


Bits application guide


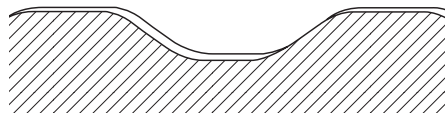
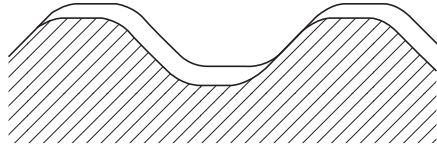
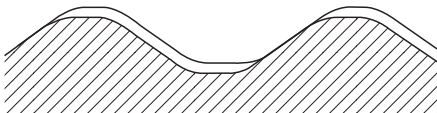
Standard Carbide Grade

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"



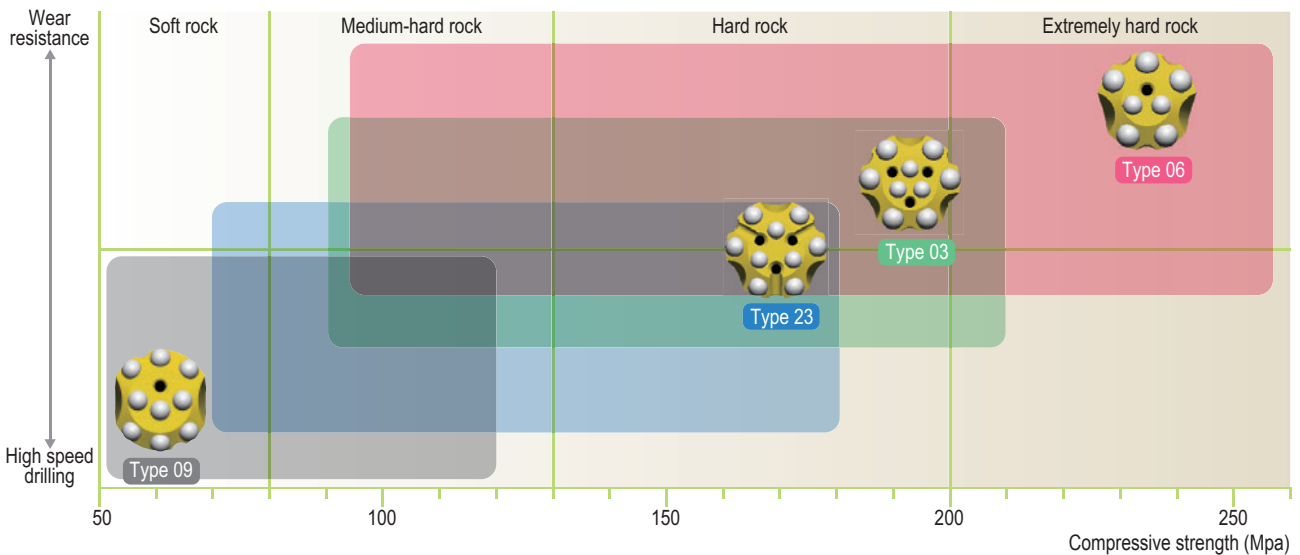
Mitsubishi Thread Compatibility

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

For Drifting & Tunnelling bits (R25, R28, R32, NR34, R35)

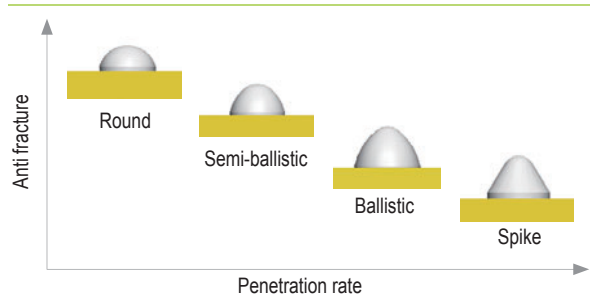
Type		Type 06	Type 03	Type 23	Type 09	Type 08	Cross
Face configuration							
Rock hardness	Hard	⊙	○	⊙	○	⊙	○
	Medium-hard	○	⊙	⊙	○	⊙	○
	Soft			○	⊙	⊙	○
Character	High speed drilling		○	○	⊙	⊙	
	Wear resistance	⊙	○				
	Straightness						○
		Wear resistant bit for medium-hard to hard rock formations.	High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




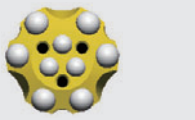



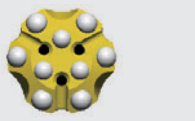



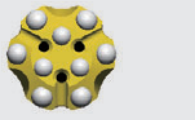


Flushing hole variety


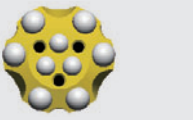





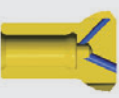
V : Face flushing hole	W : Face and side flushing hole
Normal flushing hole design.	Effective in case of plugged face flushing hole.

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	
	Type 08	
2. Soft rock drilling	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)

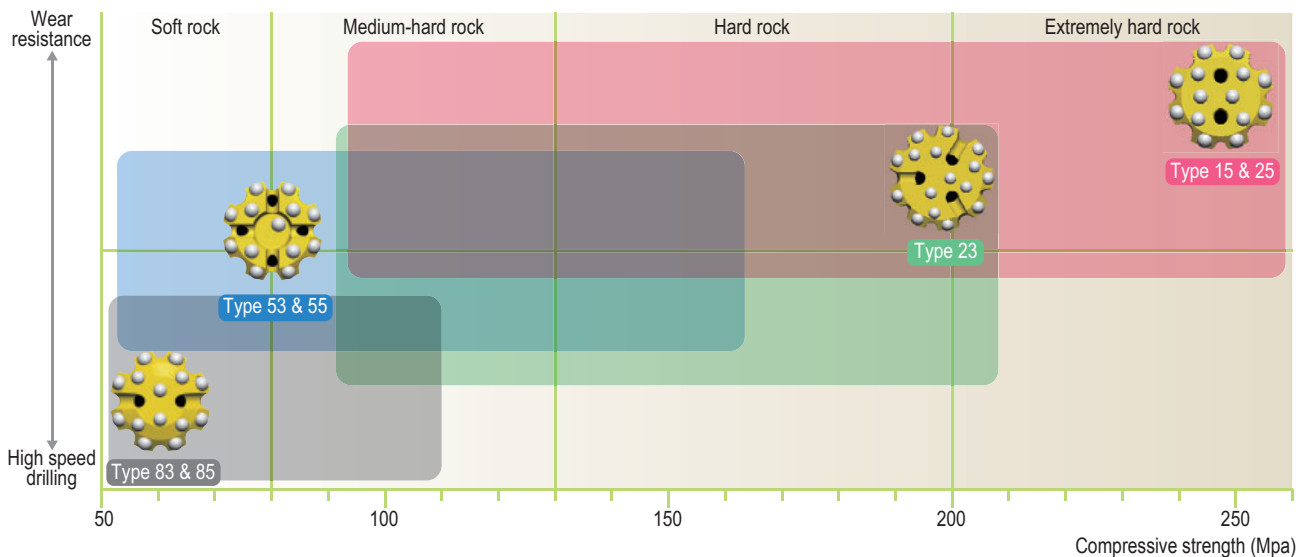
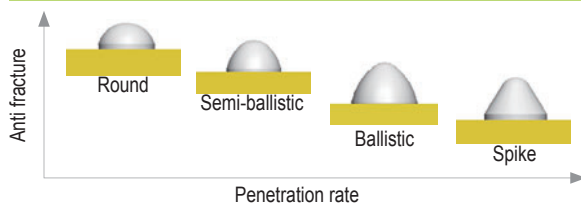
Type		Type 15 & Type 25	Type 23	Type 53 & 55	Type 83 & 85
Face configuration					
Rock hardness	Hard	⊙	○		
	Medium-hard	○	⊙	○	
	Soft			⊙	⊙
Character	High speed drilling		○		⊙
	Wear resistance	⊙	○	○	
	Straightness			○	
		Wear resistant bit for medium-hard to hard rock formations. Type 25 is recommended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



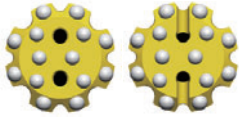
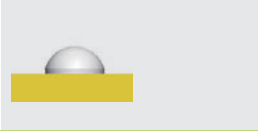
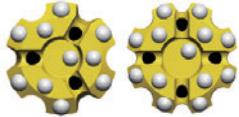
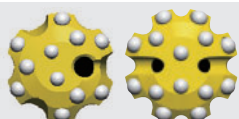







Flushing hole variety

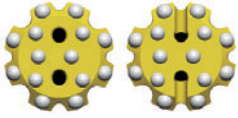
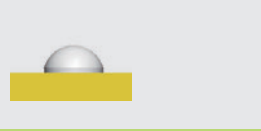
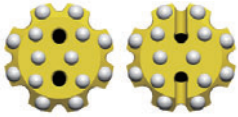
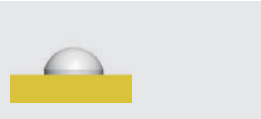
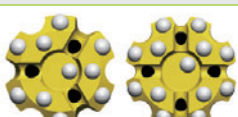
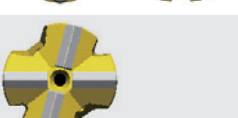



V : Face flushing hole	W : Face and side flushing hole
Normal flushing hole design.	Offers optimized flushing against plugging.

Skirt variety

S : Straight skirt	R : Retrac skirt
Normal bit skirt design.	Retrac 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	