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[Factory authorized use of ISO.
ISO9001
Factory authorized use of API Monograms
API 7-1]

TIX-TSK

TIX-TSK

Japan's Leading Manufact urer of Drilling Equipment

Long-Life Bits with Orig inal Bearing Technology

TIX - TSK

INDEX

Rock Bits

Drilling Equipment

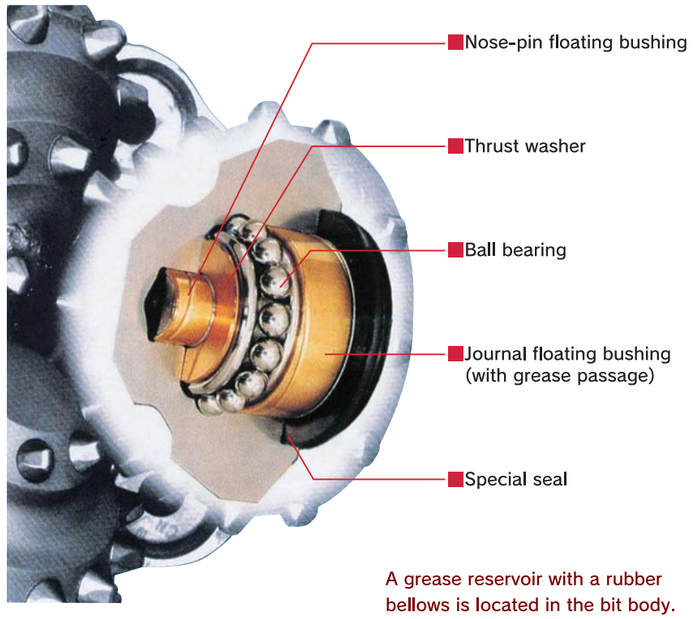
Roller Cutter

Features of Bearing Series

X-Series Bearing (Sealed Journal, 4-3/4" to 17-1/2")
M-Series Bearing (Sealed Journal : Motor, 4-3/4" to 15-1/2")

Performance
1. This type has the best bearing performance of all the bit bearing types manufactured by TSK.
2. As this floating journal bearing is designed using bearing metal having excellent anti-galling properties, the bearing is highly resistant to shock loads.

Structure
1. This bearing has a nose-pin floating bushing, a thrust washer, a ball bearing, a journal floating bushing and a special seal.
2. The floating bushing and the thrust washer are made of bearing metal that has been correctly heat treated, polished, and coated with a solid lubricant.
3. The seal has been specially developed for high-speed rotary and motor drilling.

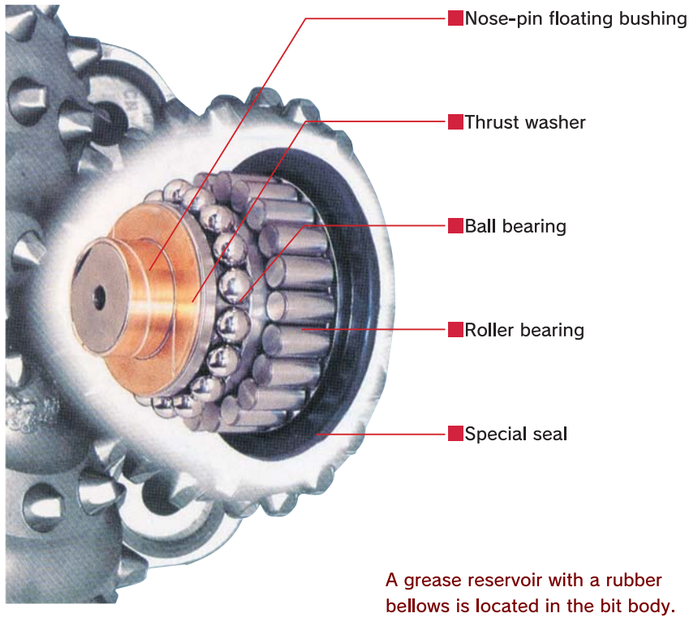


A grease reservoir with a rubber bellows is located in the bit body.

XZ-Series Bearing (Sealed Roller / Floating, 9-5/8" to 17-1/2")

Performance
This type is highly suited for high-speed rotary drilling.

Structure
1. This bearing has a nose-pin floating bushing, a thrust washer, a ball bearing, a journal roller bearing and a special seal.
2. As less heat is generated by flangeless roller bearings polished on all surfaces, this bearing is well suited for high-speed rotary drilling.
3. The seal has been specially developed for high-speed rotary drilling.

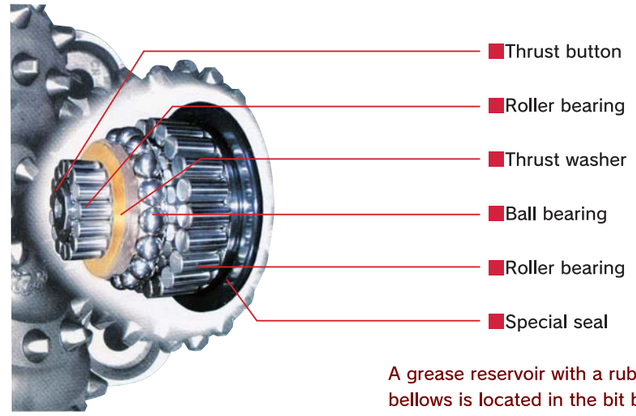


A grease reservoir with a rubber bellows is located in the bit body.

MZ-Series Bearing (Sealed Roller:Motor, 13-3/8" to 26")

Performance
This type has the perfomance needed for high-speed motor drilling.

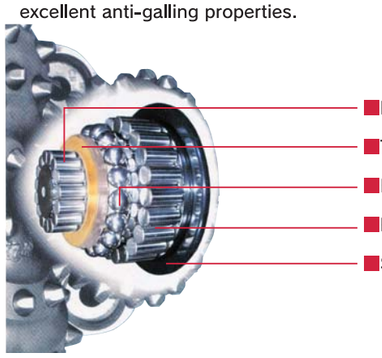
Structure
1. The bearing has a thrust button, a roller bearing, a thrust washer, a ball bearing and a special seal.
2. Heat generation is minimized by the use of flangeless roller bearings polished on all surfaces. This bearing is well suited for motor drilling.
3. The seal has been specially developed for motor drilling.



A grease reservoir with a rubber bellows is located in the bit boby.

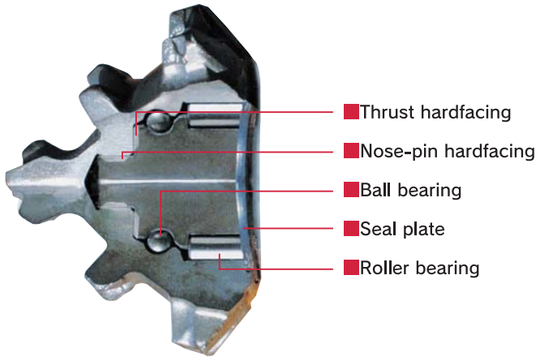
Z-Series Bearing (Sealed Roller:For Insert Bits)

1. Heat generation is minimized by the use of flangeless roller bearings with polished surfaces.
2. The thrust washer is made of bearing metal having excellent anti-galling properties.



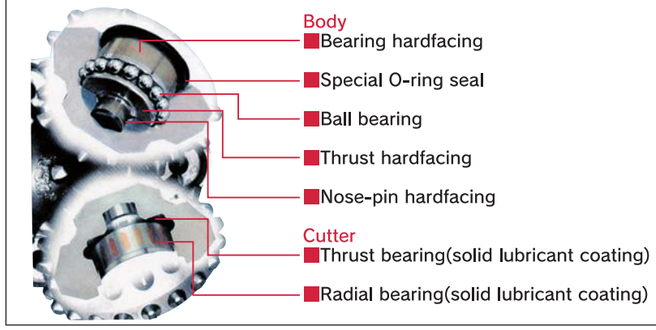
Z-Series Bearing (Sealed Roller:For Steel Tooth Bits)

This sealed roller bearing has a special seal plate structure that keeps out mud and cuttings. This type of bearing is used for steel tooth bits.



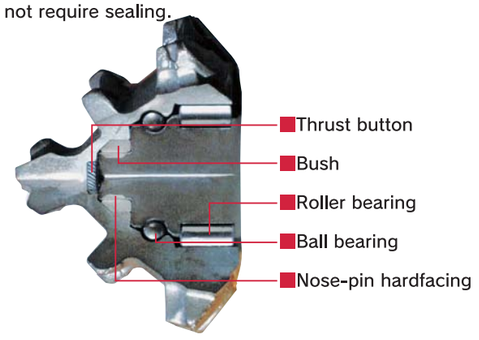
K-Series Bearing (Sealed Journal)

1. This type of bearing is well suited for high-load drilling at medium to low speeds.
2. The journal bearing faces are covered with a stellite layer (body section) and a silver alloy layer deposited over a carburized and hardened case (cutter section).



Non-Sealed Roller Bearing

This non-sealed roller bearing comprises a ball bearing and a roller bearing. It is mainly used with light loads, when drilling shallow wells, with either large-diameter bits or small-diameter bits that do not require sealing.



F Side-Scrapers (Sub Gage Row)

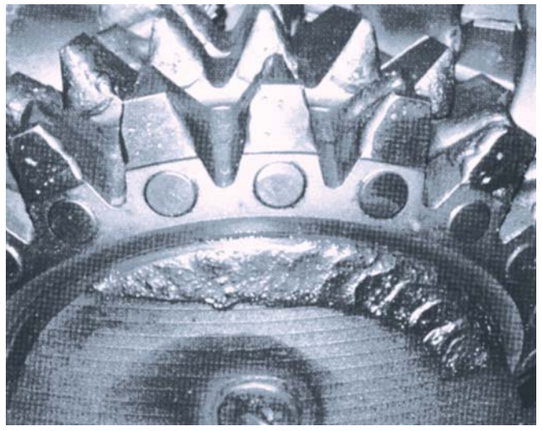
Side scrapers cut the bottom corner of the hole and determine the gage of the hole. Cone shell erosion is reduced by the use of the hardest grade of Tungsten Carbide Inserts.
(Embedded-type)

Insert Bits

(Ex:8-1/2" X20G**F**)

T Tungsten Carbide Heel Inserts (For Steel Tooth Bits)

Flat-ended Tungsten Carbide Inserts on the heel row.

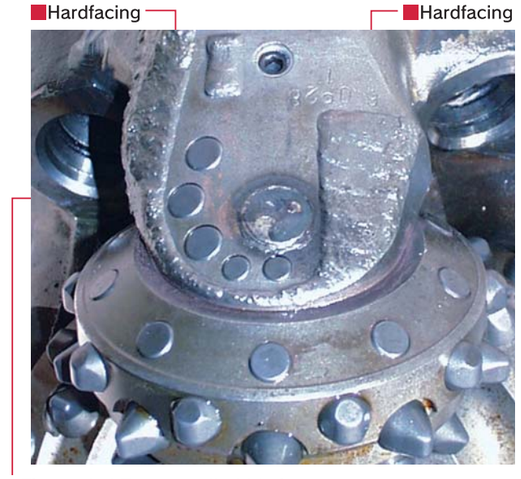


Steel Tooth Bits

(Ex:8-1/2" MS-**T**Z)

G Tungsten Carbide Inserts on the Shirttail

G:Shirttail TC Inserts
G2:Diamond Inserts on the Shirttail



(Ex:8-1/2" M20**G**)

P Stabilizer Pad

Stabilizer pads minimize the off-center running of the bit, especially when directional drilling.

Stabilizer pads reduce wear on the leg.

P:Stabilizer Pads
P2:Diamond Inserts to the Leading Edge of the Pads
P3:Full Diamond Inserts of the Pads

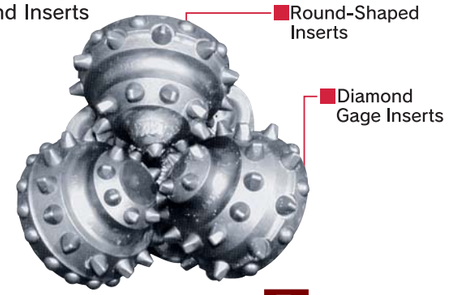
(Ex:8-1/2" M20G**P**)

R Round-Shaped Inserts(Harder Grade)(Gage Row)

More shock resistant round-shaped inserts on the gage row.
For highly abrasive application.

D Round-Shaped Diamond Gage Inserts(Gage Row)

For maximum protection of the gage row.
D1:Diamond Gage Inserts (33%)
D2:Diamond Gage Inserts (50%)
D3:Diamond Gage Inserts (100%)
DV:Whole Cutting Structure with Diamond Inserts



(Ex:8-1/2" X20G**R**F)

(Ex:8-1/2" M20G**D2**P)

V Diamond Enhanced Heel Inserts

For maximum protection of the heel area.

V1:Diamond Heel Inserts (33%)
V2:Diamond Heel Inserts (50%)
V3:Diamond Heel Inserts (100%)

V1:Every third gage insert is a diamond type.(33%)

(Ex:8-1/2" M20G**V1**P)

-G For High Temperature Use

Geothermal drilling and other hot-hole applications.
High temperature elastomer compounds using.

(Ex:8-1/2″ M30GP **-G**)

Hardfacing on the Shirttail and Leg

For Standard Bits

(Ex:8-1/2″ X20G)

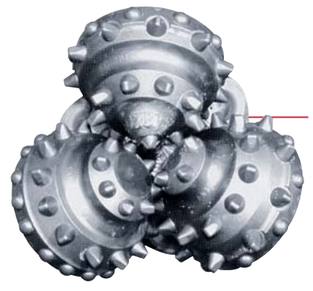
For Motor Bits With Stabilizer Pad

(Ex:8-1/2″ M20GP)

Bit Enhancements

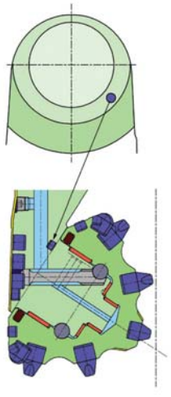
Reinforced Spearpoint

Extra handfacing of spear-point.
This prevents dropping out of the spearpoint insert during the drilling abrasive formations.



Protection of the Bearing Seal (Mud Sweeper)

Protects the bearing seal from cuttings intrusion.



Product Nomenclature

Insert Bits

12-1/4" X 30 G Y R F V P C -G

- -G:High Temperature Use
- C:Center Jet
- Leg Protection/Increased Stabilization
  - P:Stabilizer Pads
  - P2:Diamond Inserts to the Leading Edge of the Pads
  - P3:Full Diamond Inserts of the Pads
- Gage Protection
  - D:Diamond Gage Inserts(D1:33%,D2:50%,D3:100%)
  - V:Diamond Heel Inserts(V1:33%,V2:50%,V3:100%)
  - DV:Whole Cutting Structure with Diamond Inserts
- Gage Protection(Sub Gage Row)
  - F:Side-Scraper
- Gage Reinforcement
  - H:Chisel-Shaped (Gage Row)
  - R:Round-Shaped(Gage Row)
- Inner Rows
  - Y:Conical-Shaped
- Shirttail Inserts
  - G:Shirttail TC Inserts
  - G2:Diamond Inserts on the Shirttail
- Type (05,08,10,15,20,25,30,40,50,60,65,70,90)
  - IADC(41,42,43,44,51,52,53,61,62,63,72,73,83)
- Bearing Series
  - X:Sealed Journal
  - M:Sealed Journal(Motor Bits)
  - K:Sealed Journal
  - Z:Sealed Roller
  - XZ:Sealed Roller / Floating
  - MZ:Sealed Roller(Motor Bits)
- Bit Diameter

Steel Tooth Bits

12-1/4" MH – Q T X G P C -G

- -G:High Temperature Use
- C:Center Jet
- Leg Protection/Increased Stabilization
  - P:Stabilizer Pads
- G:Shirttail TC Inserts
- Bearing Series
  - X:Sealed Journal
  - M:Sealed Journal(Motor Bits)
  - Z:Sealed Roller
  - XZ:Sealed Roller / Floating
  - MZ:Sealed Roller(Motor Bits)
  - No mark:Non Sealed Roller
- Gage Protection(Heel Row)
  - T:TC inserts
  - V:Diamond Heel Inserts(V1:33%,V2:50%,V3:100%)
- Q:Full Hardfacing on Teeth
  - (M,XZ,MZ-Series Bearing:Standard:Full Hardfacing on Teeth)
- Type (SS, S,MSS,MS,MH,HS, H, HR)
  - IADC(11,12,13, 21, 23, 31,32,34)
- Bit Diameter

IADC Code Bit Classifications

				Bearing/Gage						
	Formation	Series	Type	Standard Roller Bearing ①	Roller Bearing, Air Cooled ②	Roller Bearing, Gage Protected ③	Sealed Roller Bearing ④	Sealed Roller Bearing, Gage Protected ⑤	Sealed Friction Bearing ⑥	Sealed Friction Bearing, Gage Protected ⑦
Steel Tooth Bits	Soft Formations	1	1	SS		SS-T	SS-(Z,XZ,MZ)	SS-(TZ,TXZ,TMZ)	SS-(X,M)	SS-(TX,TM)
			2	S		S-T	S-(Z,XZ,MZ)	S-(TZ,TXZ,TMZ)	S-(X,M)	S-(TX,TM)
			3	MSS		MSS-T	MSS-(Z,XZ,MZ)	MSS-(TZ,TXZ,TMZ)	MSS-(X,M)	MSS-(TX,TM)
			4							
	Medium Formations	2	1	MS		MS-T	MS-(Z,XZ,MZ)	MS-(TZ,TXZ,TMZ)	MS-(X,M)	MS-(TX,TM)
			2							
			3	MH		MH-T	MH-(Z,XZ)	MH-(TZ,TXZ)	MH-X	MH-TX
			4							
	Hard Formations	3	1	HS		HS-T	HS-(Z,XZ)	HS-(TZ,TXZ)	HS-X	HS-TX
			2	H		H-T	H-(Z,XZ)	H-(TZ,TXZ)	H-X	H-TX
			3							
			4	HR		HR-T	HR-(Z,XZ)	HR-(TZ,TXZ)	HR-X	HR-TX
Insert Bits	Soft Formations	4	1					Z05G XZ05G MZ05G		M04G X05G M05G
			2					XZ08G,MZ08G		X05GY,X08G,M08G
			3					Z10G XZ10G MZ10G		X10G X10GY M10G
			4					Z15G XZ15G MZ15G		X15G M15G
	Soft to Medium Formations	5	1					Z20G XZ20G MZ20G		X20G M20G
			2					XZ25G,MZ25G		X20GY,X25G,M25G
			3		A30			Z30G XZ30G MZ30G		X30G M30G
			4					XZ30GY		X30GY
	Medium Hard Formations	6	1		A40			Z40G XZ40G MZ40G		X40G M40G
			2		A50			Z50G,XZ50G		X50G
			3		A60			Z60G,XZ60G		X60G
			4							
	Hard Formations	7	1							
			2							X65G
			3		A70					X70G
			4							
	Extremely Hard Formations	8	1							
			2							
			3		A90					X90G
			4							

List of Products - Insert Bits

Bit size		Connection thread	Sealed roller bearings	Sealed journal bearings	Air bearings	Weight
mm	in	API Reg.				(kgf)
98.4	3-7/8″	2-3/8″		K30G, K40G		3.8
101.6	4″	2-3/8″		K30G, K40G		4.4
114.3	4-1/2″	2-3/8″		K30G, K40G		5.3
120.7	4-3/4″	2-7/8″		X30G, X40G, M30G, M40G		9.6
123.8	4-7/8″	2-7/8″		X30G, X40G, M30G, M40G		9.7
142.9	5-5/8″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		16.0
149.2	5-7/8″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		17.0
152.4	6″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		17.5
155.6	6-1/8″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		18.0
158.8	6-1/4″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		18.0
165.1	6-1/2″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		20.0
171.5	6-3/4″	3-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		22.0
190.5	7-1/2″	4-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		32.3
193.7	7-5/8″	4-1/2″		X20G, X30G, X40G, M20G, M30G, M40G		33.3
200.0	7-7/8″	4-1/2″		X20G, X30G, X40G, X50G, X60G, X70G M20G, M30G, M40G		34.8
212.7	8-3/8″	4-1/2″		X20G, X30G, M20G, M30G		42.0
215.9	8-1/2″	4-1/2″	Z20G, Z30G, Z40G XZ20G, XZ30G, XZ40G	X10G, X20G, X30G, X40G, X50G, X60G M10G, M20G, M30G, M40G, M50G	A30	44.3
219.1	8-5/8″	4-1/2″	Z20G, Z30G, XZ30G	X20G, X30G, X40G, M20G, M30G, M40G		45.0
222.3	8-3/4″	4-1/2″	Z20G, Z30G, XZ30G	X20G, X30G, M20G, M30G		46.0
244.5	9-5/8″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, X40G, M20G, M30G, M40G		62.0
250.8	9-7/8″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, X40G, M20G, M30G, M40G		65.0
269.9	10-5/8″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, X40G, M20G, M30G, M40G		77.0
279.4	11″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, M20G, M30G		80.0
295.3	11-5/8″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, M20G, M30G		101.0
304.8	12″	6-5/8″	Z20G, Z30G, XZ30G	X20G, X30G, M20G, M30G		106.0
311.2	12-1/4″	6-5/8″	Z10G, Z20G, Z30G XZ05G, XZ10G, XZ20G XZ30G, XZ40G	X05G, X10G, X20G, X30G, X40G, X50G M05G, M10G, M20G, M30G, M40G	A30, A90	110.0
349.3	13-3/4″	6-5/8″	Z10G, Z20G, XZ20G	X10G, X20G, M10G, M20G,		144.0
374.7	14-3/4″	7-5/8″ (or 6-5/8″)	Z10G, Z20G, MZ20G	X10G, X20G, M10G, M20G,		166.0
381.0	15″	7-5/8″	Z10G, Z20G, MZ20G	X10G, X20G, M10G, M20G,	A60, A90	182.0
393.7	15-1/2″	7-5/8″	Z10G, Z20G, MZ20G	X10G, X20G, M10G, M20G,		190.0
406.4	16″	7-5/8″	Z10G, Z20G, MZ20G	X10G, X20G, M10G, M20G,		194.0
444.5	17-1/2″	7-5/8″	Z10G, Z20G, Z30G XZ05G, XZ10G, XZ20G MZ05G, MZ10G, MZ20G	X05G, X10G, X15G, X20G, X30G M05G, M10G, M15G, M20G, M30G		265.0
508.0	20″	7-5/8″ (or 8-5/8″)	Z20G, Z30G, MZ20G			340.0
527.1	20-3/4″	7-5/8″ (or 8-5/8″)	Z20G, Z30G, MZ20G			406.0
558.8	22″	7-5/8″ (or 8-5/8″)	Z20G, Z30G, MZ20G			434.0
584.2	23″	7-5/8″ (or 8-5/8″)	Z20G, Z30G, MZ20G			459.0
609.6	24″	7-5/8″ (or 8-5/8″)	Z10G, Z20G, Z30G MZ05G, MZ10G, MZ20G			540.0
660.4	26″	7-5/8″ (or 8-5/8″)	Z20G, MZ20G			560.0

List of Products - Steel Tooth Bits

Bit size		Connection thread	Non-sealed roller bearings	Sealed roller bearings	Sealed journal bearings	Weight
mm	in	API Reg.				(kgf)
98.4	3-7/8″	2-3/8″	MH, H			3.8
101.6	4″	2-3/8″	MH, H			4.2
114.3	4-1/2″	2-3/8″	MH, H			5.1
120.7	4-3/4″	2-7/8″	S, MS, MH, H		S-X, MS-X, MH-X	6.9
123.8	4-7/8″	2-7/8″	S, MS, MH, H		S-X, MS-X, MH-X	7.0
142.9	5-5/8″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	15.0
149.2	5-7/8″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	16.0
152.4	6″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	16.5
155.6	6-1/8″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	17.0
158.8	6-1/4″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	17.0
165.1	6-1/2″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	19.0
171.5	6-3/4″	3-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	21.0
190.5	7-1/2″	4-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	31.0
193.7	7-5/8″	4-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	32.0
200.0	7-7/8″	4-1/2″	S, MS, MH, H		S-X, MS-X, MH-X	34.0
212.7	8-3/8″	4-1/2″	S, MS, MH, H	MS-Z	S-X, MS-X, MH-X	40.0
215.9	8-1/2″	4-1/2″	SS, S, MSS, MS, MH, H, HR	SS-Z, S-Z, MSS-Z MS-Z, MH-Z, HS-Z SS-XZ, MSS-XZ	SS-X, S-X, MSS-X MS-X, MH-X, HS-X SS-M, S-M, MSS-M	42.0
219.1	8-5/8″	4-1/2″	S, MS, MH, H	S-Z, MS-Z,	S-X, MSS-X, S-M	43.0
222.3	8-3/4″	4-1/2″	S, MS, MH, H	S-Z, MS-Z,	S-X, MSS-X, S-M	44.0
244.5	9-5/8″	6-5/8″	S, MS, MH, H	S-Z, MS-Z, MH-Z	S-X, MSS-X, S-M	59.0
250.8	9-7/8″	6-5/8″	SS, S, MS, MH, H	SS-Z, S-Z, MS-Z SS-XZ, S-XZ	SS-X, S-X, MSS-X SS-M, S-M, MSS-M	61.0
269.9	10-5/8″	6-5/8″	S, MS, MH, H	SS-Z, MSS-Z, SS-XZ	S-X, MSS-X, S-M	72.0
279.4	11″	6-5/8″	S, MH,	SS-Z, MSS-Z, SS-XZ	S-X, MSS-X, S-M	75.0
295.3	11-5/8″	6-5/8″	S, MH,	SS-Z, MSS-Z, SS-XZ	S-X, MSS-X, S-M	94.0
304.8	12″	6-5/8″	S, MH,	SS-Z, MSS-Z, SS-XZ	S-X, MSS-X, S-M	99.0
311.2	12-1/4″	6-5/8″	SS, S, MSS, MS, MH, H, HR	SS-Z, S-Z, MSS-Z MS-Z, MH-Z, HS-Z SS-XZ, MSS-XZ	SS-X, S-X, MSS-X MS-X, MH-X, HS-X SS-M, S-M, MSS-M	103.0
349.3	13-3/4″	6-5/8″	S, MH,	SS-Z, MS-Z, SS-XZ	SS-X, MSS-X, SS-M	134.0
374.7	14-3/4″	7-5/8″ (or 6-5/8″)	S, MS, MH, H	SS-Z, MS-Z, SS-MZ	SS-X, MSS-X, SS-M	152.0
381.0	15″	7-5/8″	S, MS, MH, H	SS-Z, MS-Z, SS-MZ	SS-X, MSS-X, SS-M	162.0
393.7	15-1/2″	7-5/8″	S, MS, MH, H	SS-Z, MS-Z, SS-MZ	SS-X, MSS-X, SS-M	170.0
406.4	16″	7-5/8″	S, MS, MH, H	SS-Z, MS-Z, SS-MZ	SS-X, MSS-X, SS-M	172.0
444.5	17-1/2″	7-5/8″	SS, S, MSS, MS, MH, H	SS-Z, S-Z, MSS-Z MS-Z, MH-Z, HS-Z SS-XZ, SS-MZ	SS-X, S-X, MSS-X MS-X, MH-X, HS-X SS-M, S-M, MSS-M	242.0
508.0	20″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		302.0
527.1	20-3/4″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		364.0
558.8	22″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		392.0
584.2	23″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		404.0
609.6	24″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		485.0
660.4	26″	7-5/8″ (or 8-5/8″)	SS, S, MS, MH	SS-Z, MS-Z, SS-MZ		520.0

Recommended Make-up Torques for Bit Connections

Bit size		Connection thread	Make-up torque	
in	mm	API Reg	ft.lbs	N.m
3-3/4"~ 4-1/2"	95.2 ~ 114.3	2-3/8"	3000 ~ 3500	4000 ~ 4700
4-5/8"~ 5"	117.5 ~ 127.0	2-7/8"	4500 ~ 5500	6100 ~ 7500
5-1/8"~ 7-3/8"	130.2 ~ 187.3	3-1/2"	7000 ~ 9000	9500 ~ 12000
7-1/2"~ 9-3/8"	190.5 ~ 238.1	4-1/2"	12000 ~ 16000	16000 ~ 22000
9-1/2"~ 14-3/4"	241.3 ~ 374.7	6-5/8"	28000 ~ 32000	38000 ~ 43000
14-5/8"~ 26"	371.5 ~ 660.4	7-5/8"	34000 ~ 40000	46000 ~ 54000

Jet Nozzles

Bit Size Range (in)	Bit Size Range (mm)	Standard Nozzle part code	Shrouded Nozzle part code
4″ – 4-1/8″	101.6 – 104.8	YN	–
4-3/4″ – 4-7/8″	120.7 – 123.8	SN	–
5-5/8″ – 6-3/4″	142.9 – 171.5	AN	ANS
7-1/2″ – 7-7/8″	190.5 – 200.0	BN	BNS
8-1/2″ – 13-3/4″	215.9 – 349.3	CN	CNS
14-3/4″ – 26″	374.7 – 660.4	DN	DNS

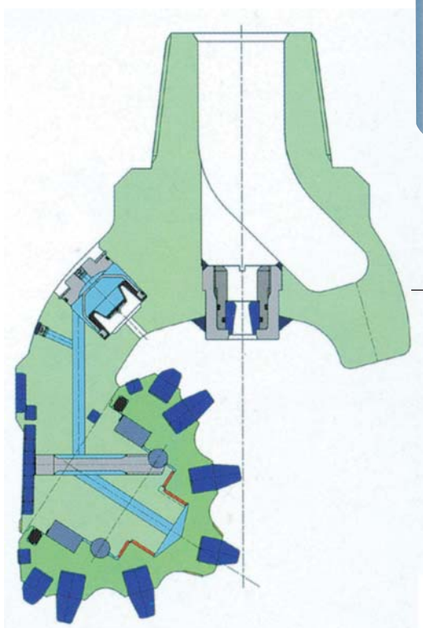
Standard Nozzle

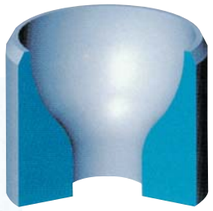
Shrouded Nozzle

C Center Jet Nozzles

The Center Jet is a very effective way of preventing "balling-up", a condition where the cuttings are packed between cutters when drilling very soft and sticky formations.

(Ex:17-1/2" SS-TMZG C)





Standard Nozzle

Long Nozzle

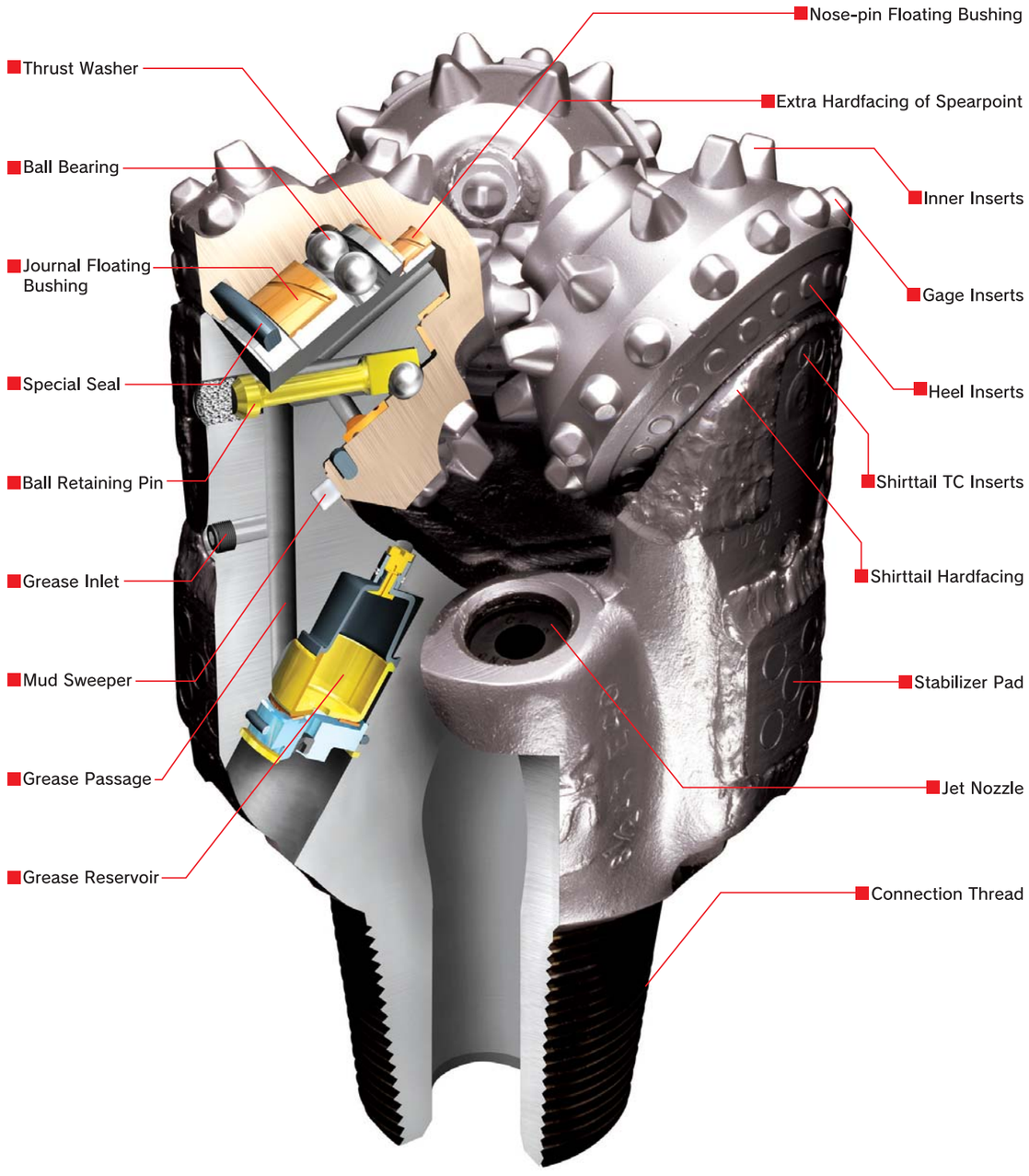
Diffuser Nozzle

Center Jet Nozzles

Bit Size Range (in)	Standard Nozzle part code	Long Nozzle part code	Diffuser Nozzle part code
8-1/2″	—	MN=CJ	—
9-7/8″-11-5/8″	SN	—	—
12-1/4″-16″	AN	—	—
17-1/2″~26″	CN	CN=CJ	CN=DC

M-Series(X-Series) Sealed Journal Bearing Bits Design

The TSK M-Series(X-Series), floating bearings are made of special copper alloy and silver plated having the lowest heat generation property as well as superior anti-galling property.
TSK has been developing new seals made of HNBR.



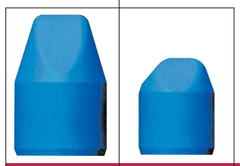
Insert Bits Products

Type 05 IADC: 415, 417

Application:
For drilling in very soft formations with low compressive strength.

Tooth profile and arrangement:
The teeth have the largest tip diameter of all other bit types and the tallest and widest teeth can achieve higher ROP (Rate of Penetration).

The teeth are spaced widely and unevenly.
The cones have a large offset.

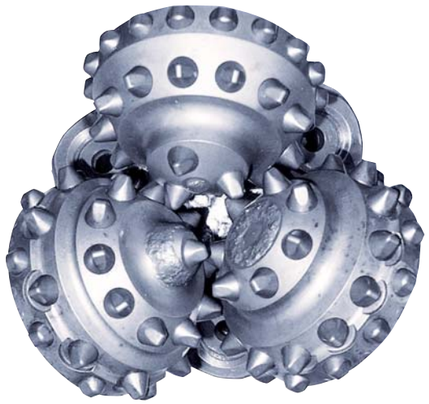


Type 10 IADC: 435, 437

Application:
For drilling in soft formations with low compressive strength.

Tooth profile and arrangement:
The teeth normally have smaller tip diameter and are shorter than type 05 bit, but taller and wider teeth can also achieve higher ROP.

The teeth are also spaced widely and unevenly.
The cones have a large offset.



Type 15 IADC: 445, 447

Application:
For drilling in soft formations with low compressive strength.

Tooth profile and arrangement:
The main teeth are normally with smaller tip diameter and are shorter than type 10 bit, but have the same sharpness.

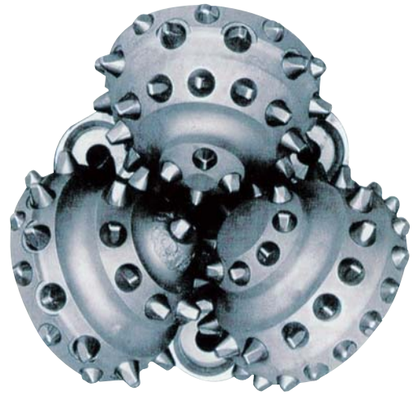
The teeth are also spaced widely and unevenly.
The cones have a large offset.

Type 20 IADC: 515, 517

Application:
For drilling in soft to medium formations with low compressive strength.

Tooth profile and arrangement:
The main teeth normally have smaller tip diameter and are shorter than type 15 bit.

The teeth are also spaced unevenly and the cones have a large offset.

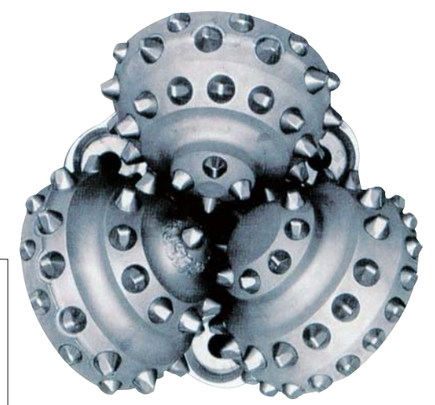


Type 30 IADC: 532, 535, 537

Application:
This type is generally used for drilling in medium formations with low compressive strength, but it also performs well in semi-abrasive formations.

Tooth profile and arrangement:
The tip diameter is similar to type 20 bit, but in order to avoid tip damage during drilling, teeth height is set low.

The teeth are also spaced unevenly and the cones have moderate degree of offset.

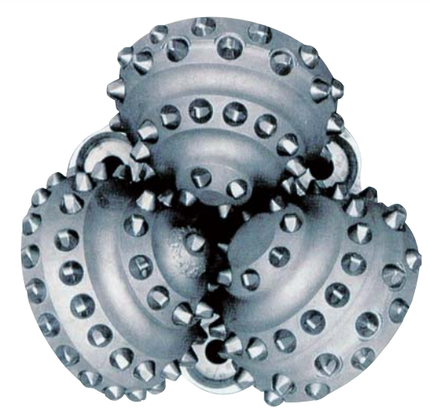


Type 40 IADC: 612, 615, 617

Application:
For drilling in medium hard formations with high compressive strength.

Tooth profile and arrangement:
To minimize tip damage during crushing by main teeth in medium hard formations, teeth have a smaller diameter and lower height than type 30 bit.

The teeth are also spaced unevenly and the cones have moderate degree of offset.



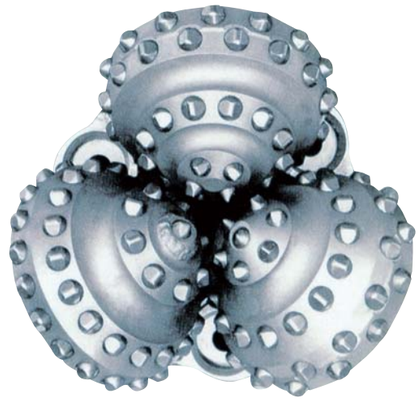
Insert Bits Products

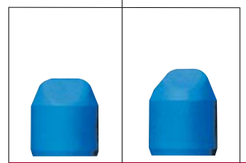
Type 50 — IADC: 622, 625, 627

Application:
For drilling in semi-abrasive, medium hard formations with high compressive strength.

Tooth profile and arrangement:
The teeth height is kept low to prevent tip damage during continuous crushing under heavy WOB (Weight on Bit) conditions.

The teeth are also spaced unevenly but the cones have no offset.





Type 60 — IADC: 632, 635, 637

Application:
For drilling in semi-abrasive, medium hard formations with high compressive strength.

Tooth profile and arrangement:
The main teeth have a conical shape to allow continuous crushing under heavy WOB conditions.

The cones have no offset.

Type 70 — IADC: 732, 737

Application:
For drilling in abrasive and hard formations.

Tooth profile and arrangement:
The main teeth have a double conical shape to allow continuous crushing under heavy WOB conditions.

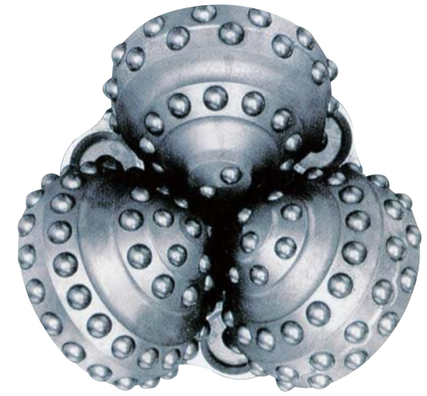
There is no cone offset.

Type 90 — IADC: 832, 837

Application:
For drilling in abrasive and extremely hard formations.

Tooth profile and arrangement:
Both main and gage teeth have a round shape to allow continuous crushing under heavy WOB conditions in order to prevent tip damage.

There is no cone offset.



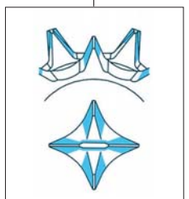
Steel Tooth Bits Products

Type SS — IADC: 111, 113, 114, 115, 116, 117

Application:
For drilling in very soft formations with low compressive strength.

Tooth profile and arrangement:
The SS type has the tallest and widest tooth. The wide tooth spacing and a large offset allows a higher ROP (Rate of Penetration).

Remarks:
Hardfacing areas are shown in blue in the diagram below.
The gage faces and the inner teeth back faces are also hardfaced.

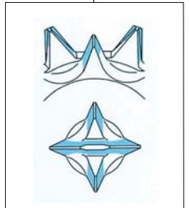


Type S — IADC: 121, 123, 124, 125, 126, 127

Application:
For drilling in soft formations with low compressive strength.

Tooth profile and arrangement:
This type has a similar tooth size to type SS bit.
The wide tooth spacing and a large offset allows a higher ROP.
This type has slightly more teeth than SS type.

Remarks:
Hardfacing areas are shown in blue in the diagram below.
The gage faces and the inner teeth back faces are also hardfaced.



Steel Tooth Bits Products

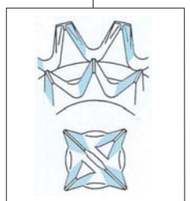
Type MSS IADC: 131, 133, 134, 135, 136, 137

Application:
For drilling in soft formations with low compressive strength.

Tooth profile and arrangement:
This type has a moderate tooth height and interruption on the inner and outer sides of the gage teeth. In addition, the gage teeth are reinforced by T-shape to obtain a stronger gage face than SS or S type.

Tooth spacing is also adjusted for optimal drilling of these types of formations.

Remarks:
Hardfacing areas are shown in blue in the diagram below.
The gage faces and the inner teeth back faces are also hardfaced.

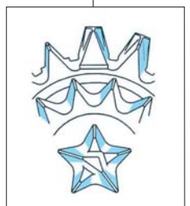


Type MS IADC: 211, 213, 214, 215, 216, 217

Application:
For drilling in medium formations with high compressive strength.

Tooth profile and arrangement:
This type has a moderate tooth size and closer tooth spacing. The gage teeth are reinforced by T-shape to obtain a stronger gage face.

Remarks:
Hardfacing areas are shown in blue in the diagram below.
The gage faces and the inner teeth back faces are also hardfaced.

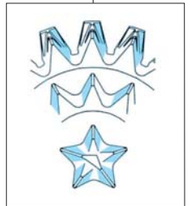


Type MH IADC: 231, 233, 234, 235, 236, 237

Application:
For drilling in medium hard formations with high compressive strength.

Tooth profile and arrangement:
This type has a moderate tooth size and closer tooth spacing. The gage teeth are reinforced by T-shape to obtain a stronger gage face.

Remarks:
Hardfacing areas are shown in blue in the diagram below.
The gage faces and the inner teeth back faces are also hardfaced.

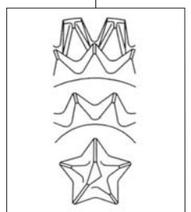


Type HS IADC: 311, 313, 314, 315, 316, 317

Application:
For drilling in semi-abrasive and hard formations.

Tooth profile and arrangement:
This type has more and shorter teeth and also closer tooth spacing.
The gage teeth are reinforced by T-shape to obtain a stronger gage face.

Remarks:
As there is tendency for hardfacing on teeth to chip or break-off during crushing in hard and abrasive formations under heavy WOB conditions, the main teeth and sides of gage teeth are not hardfaced. However the gage faces are hardfaced.

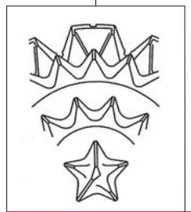


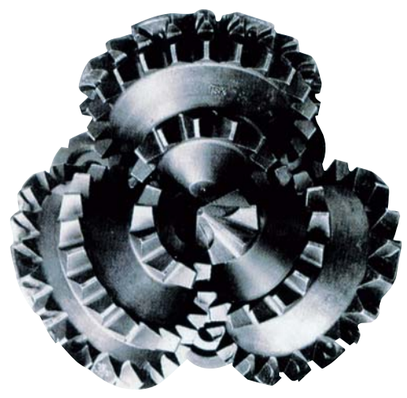
Type H IADC: 321, 323, 324, 325, 326, 327

Application:
For drilling in abrasive and hard formations.

Tooth profile and arrangement:
While the size and numbers of teeth are the same as type HS, a web connects 2 or 3 gage teeth to obtain a large hardfacing area.

Remarks:
For the same reason as type HS, only the gage faces are hardfaced.
However the inner teeth are not hardfaced.



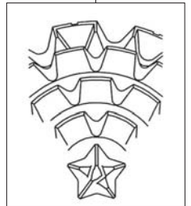


Type HR IADC: 341, 343, 344, 345, 346, 347

Application:
For drilling in abrasive and extremely hard formations.

Tooth profile and arrangement:
While gage teeth are the same as type H, the inner teeth have a curve shape for drilling of these types of formations.

Remarks:
For the same reason as type HS, only the gage faces are hardfaced.
However the inner teeth are not hardfaced.



Stabilizers

Welded Blade Stabilizer

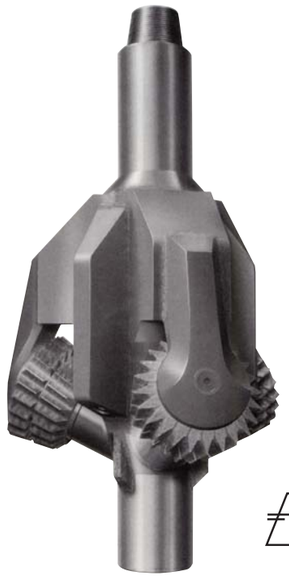
Integral Blade Stabilizer

Sleeve Type Stabilizer

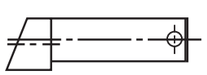
Hole Size	Body Diameter	Overall Length	Blade Length	Blade Width
7-3/8~7-7/8	5-3/4~6-1/4	47	10	1-3/4
8-3/8~9	6~7	47	10	1-3/4
9-3/8~9-7/8	6-3/4~8	55	12	1-3/4
10-5/8~11	7~8	55	12	1-3/4
11-1/2~12-1/4	7~9-5/8	55	12	1-3/4
14-3/4~15	7-3/4~10	63	15	2-3/16
17~17-1/2	7-3/4~11	63	18	2-3/8
22	8~11	67	18	2-1/2
26	8~11	67	18	2-1/2

All dimension are in inches.

Hole Opener



Bracket Type



Pin Type
(Replaceable Cutters)

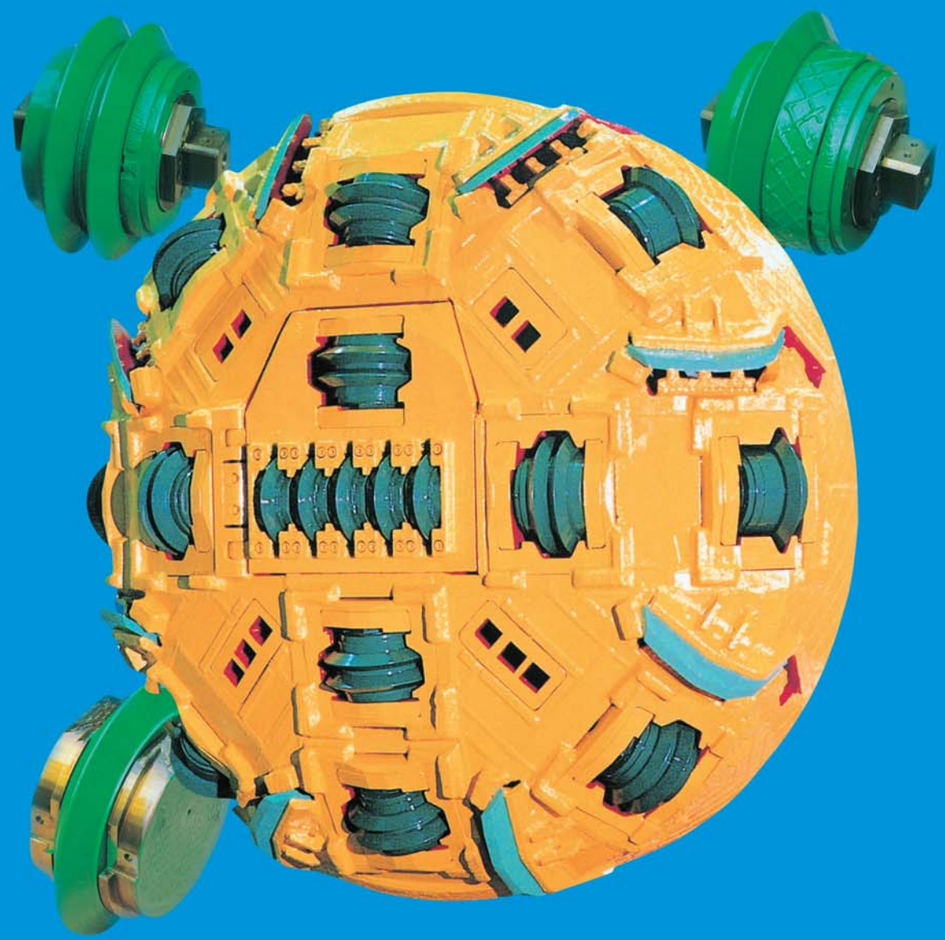
Type S

Type M

Type H

Type K-30

On the strength of our wide experience of manufacturing Rock Bits, we have developed and are also supplying a Roller Cutter for Shield Tunneling Machines, etc.
These are manufactured under strict quality control system, and these products are being supplied to major Heavy Engineering Enterprises.



Special Features of TIX-TSK Roller Cutter

1. In principle, production of Roller Cutter is on order to order basis and in this regard any enquiry will be highly appreciated.

2. The Tungsten Carbide material used for hardfacing has been developed by ourselves using the experience gained in making Rock Bits. It has an excellent reputation for wear resistance and durability and is much appreciated by its users.

3. The unit is normally supplied with a floating (metal) seal, but depending on design requirements, our own developed rectangular (rubber) seal can be supplied. This uses HNBR material, and has a better wear resistance performance.

Roller Cutter

For Shield Tunneling Machine & For T.B.M.

Tungsten Carbide Insert Disk Cutter

Cone Type Center Cutter

Ring Replaceable Disk Cutter

One Ring Type (for Gage)

Two Ring Type (for Inner)

Ring Replaceable Center Cutter

For Tunneling Machine

Disk Type(Tungsten Carbide Insert Type)

Disk Type(Steel Tooth Hardfacing Type)

Tungsten Carbide Insert Type

Cone Cutter

Single Cone Type, 2 Cone Type and 3 Cone Type are available.

TIX-TSK Rock Bits…
Getting Down to Business