

NEW PRODUCT NEWS

mgt
MEGA TECH
METALWORK

Tungaloy Report No. 509-G

Exchangeable head drill

DRILL **FORCE** MEISTER

Large-Diameter exchangeable-head drill line with exceptional reliability - Now offering the high-precision SMC drill head in $\phi 20.0$ to 25.9 mm





DRILL^{FORCE} MEISTER



Unique clamping concept and two effective cutting edges on the drill head provide excellent hole quality and high productivity

DRILL^{FORCE} MEISTER

Exchangeable-head drills with 2 effective cutting edges Rigid design provides extreme reliability

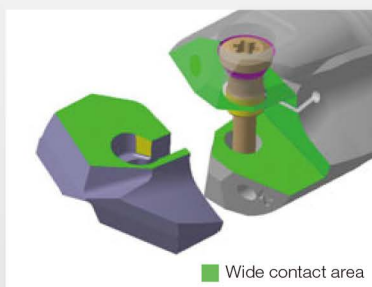
- Extremely cost efficient for drilling $\varnothing 20 - \varnothing 41$ mm bores
- Screw clamping method ensures a rigid drill head fixation
- Optimized flute design for enhanced drill body stiffness
- Drill heads are offered in **AH9130** or **AH725** for long and predictable tool life



Coolant is directed close to the cutting point, promoting superior chip evacuation and cooling effect of the cutting edges

Flanged shank for better gripping

A low helix design provides the drill body with high bending stiffness



Large-sized clamping screw for secure insert retention

- A large dedicated clamping screw and wide contact faces provide strong insert retention, ensuring tool stability during aggressive machining
- Easy insert exchange is enabled by simply loosening the screw, allowing the insert to be replaced while the drill remains on the machine spindle

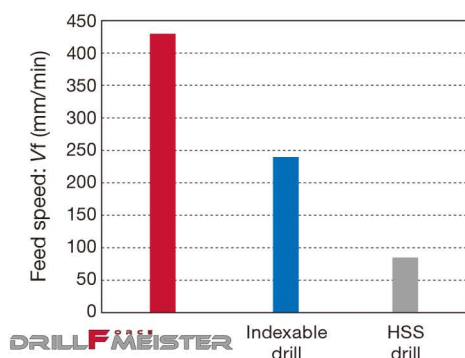
Tungaloy Report No. 509-G

■ Stable operations in various drilling applications

Rigid drill body design and secure insert retention provide superior drilling stability and long tool life in aggressive machining conditions in which tool breakage is common.



■ High productivity



P Tool : $\phi 33$ mm, L/D = 5
Workpiece material: S55C / C55

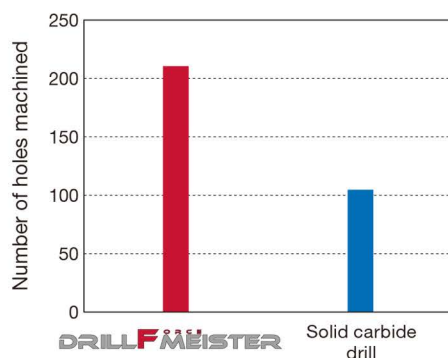
	Cutting speed Vc (m/min)	Feed f (mm/rev)	Feed speed Vf (mm/min)
DRILLFMEISTER	100	0.4	430
Indexable drill	150	0.15	240
HSS drill	20	0.4	85

Secure drill tip clamping and high-rigidity body provides remarkable increase in productivity.

■ Economical advantage

- Provides longer tool life than solid carbide drills or HSS drills
- Eliminates the need for regrinding and simplifies tool management

■ Tool life comparison



P Tool : $\phi 32$ mm, L/D = 5
Workpiece material : SCM440 / 42CrMo4
Cutting speed : Vc = 80 m/min
Feed : f = 0.3 mm/rev
Hole depth : H = 120 mm
Coolant : Wet (Internal coolant)

DRILL^{FORCE} MEISTER

SMP - General purpose

P M K S H

DC = $\varnothing 20$ - $\varnothing 41$ mm



- General purpose drill head
- Excellent chip control in long chipping materials such as low alloy steel
- Sharp cutting edge preparation for soft cutting and long tool life

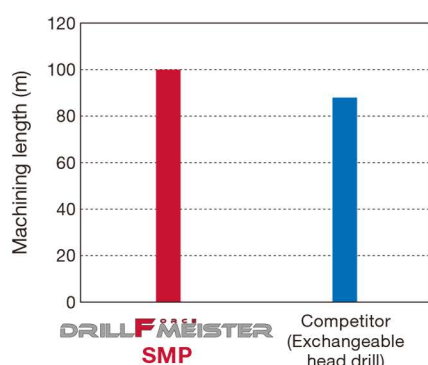
■ Excellent chip control

DrillForce-Meister provides good chip control even in drilling low carbon steel.

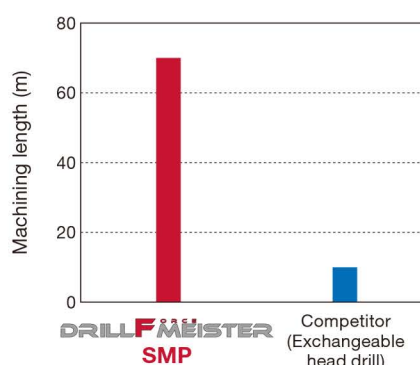
Feed: f (mm/rev)	0.4			
	0.3			
	0.2			
		DRILL ^{FORCE} MEISTER	Competitor A	Competitor B

P Tool : TIS260F32-5
 Drill head : SMP260 ($\varnothing 26$ mm)
 Grade : AH725
 Workpiece material : SS400 / E275A
 Cutting speed : $V_c = 100$ m/min
 Feed : $f = 0.2 - 0.4$ mm/rev
 Hole depth : $H = 100$ mm
 Machine : Horizontal M/C (BT50)
 Coolant : Wet (Internal coolant)

■ Long tool life



P Tool : TIS260F32-3
 Drill head : SMP260 ($\varnothing 26$ mm)
 Grade : AH725
 Workpiece material : S45C / C45
 Cutting speed : $V_c = 70$ m/min
 Feed : $f = 0.3$ mm/rev
 Hole depth : $H = 16$ mm
 Coolant : Wet (Internal coolant)



K Tool : TIS340F40-3
 Drill head : SMP345 ($\varnothing 34.5$ mm)
 Grade : AH725
 Workpiece material : FC200 / 200
 Cutting speed : $V_c = 80$ m/min
 Feed : $f = 0.22$ mm/rev
 Hole depth : $H = 50$ mm
 Coolant : Wet (Internal coolant)

SMF - Flat-edged drill head

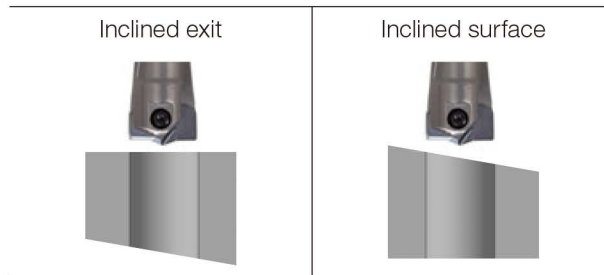
P M K S H

DC = $\phi 20$ - $\phi 41$ mm



- Promotes easy drilling on irregular surfaces such as inclined or cast surfaces
- Well suited for counterboring bolt heads
- Streamlines the drilling process of step holes on shaft components

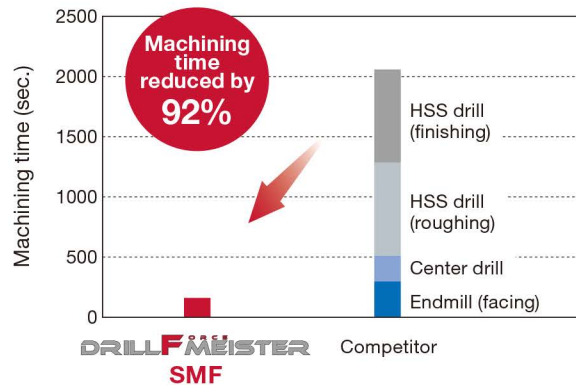
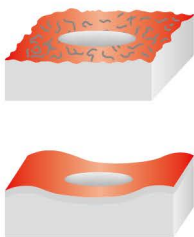
Typical applications for irregular surfaces



for holes $\leq 3xD$, up to 10°

■ Enables efficient drilling of cast and other irregular surfaces

When drilling on cast, inclined, or other irregular surfaces, the SMF drill head eliminates the need for spot drilling or end milling typically required to facilitate subsequent drilling. SMF drill head enables single-pass drilling, substantially reducing machining time.



Tool : TIS320F40-5
 Drill head : SMF320 ($\phi 32$ mm)
 Grade : AH9130
 Cutting speed : $V_c = 80$ m/min
 Feed : $f = 0.3$ mm/rev
 Feed speed : $V_f = 239$ mm/min
 Hole depth : $H = 140$ mm

■ Optimizing step hole drilling (for shafts)

For machining of step holes on the shafts, instead of using standard angled-tip drill, use SMF flat drill head to optimize stock to be removed in the following finish boring process.

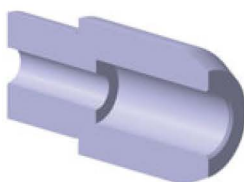
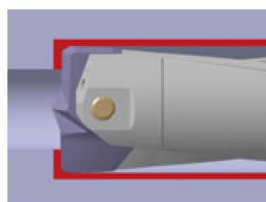
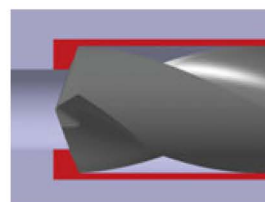


Image for step holes



DRILLFMEISTER SMF



Solid drill
140°

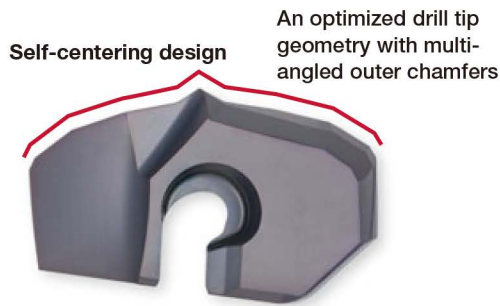
■ Extra stock to be removed during finishing with internal turning tool

DRILL^{FORCE}MEISTER

SMC - High precision drilling



DC = $\varnothing 20$ - $\varnothing 33$ mm



- Pre-drilling is unnecessary
- Outstanding **drilling stability**
- Sophisticated geometry prevents cutting edge fracture and burr formation on the workpiece

■ Hole quality

Stability



DRILL^{FORCE}MEISTER
SMC

Chatter



Competitor

P Tool : $\varnothing 26$ mm, L/D = 8
Workpiece material : Alloy steel
Cutting speed : $V_c = 100$ m/min
Feed : $f = 0.3$ mm/rev

■ Burr formation

Stability



DRILL^{FORCE}MEISTER
SMC

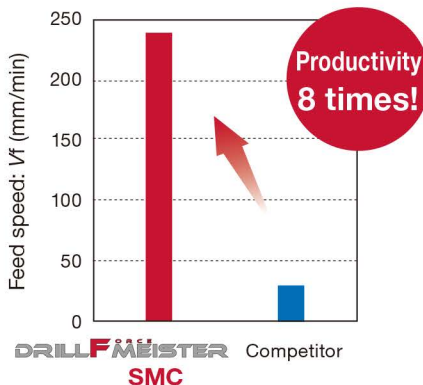
Burr



Competitor

P Tool : $\varnothing 26$ mm, L/D = 8
Workpiece material : Low carbon steel
Cutting speed : $V_c = 100$ m/min
Feed : $f = 0.3$ mm/rev

■ Stable long-overhang drilling with no need for pre-drilling



K Tool : TIS260F32-8
Drill head : SMC260
Grade : AH9130
Workpiece material : FCD600 / 600-3
Cutting speed : $V_c = 80$ m/min
Feed : $f = 0.25$ mm/rev
Hole depth : $H = 150$ mm
Hole type : Through holes
Coolant : Wet



Optimized edge preparation

Close-up of edges

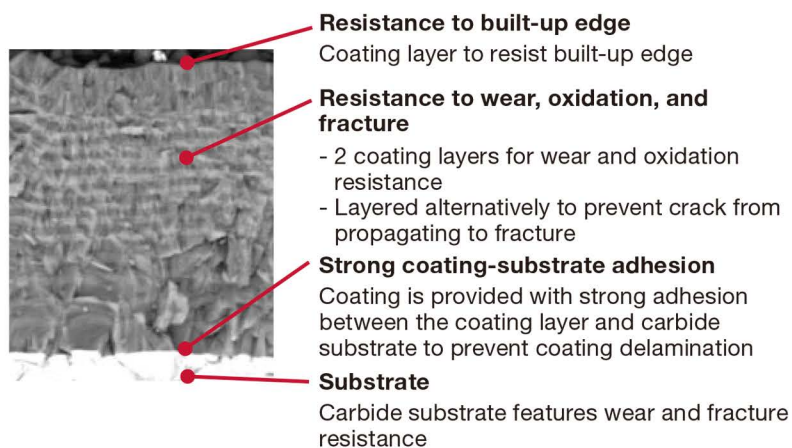


GRADES

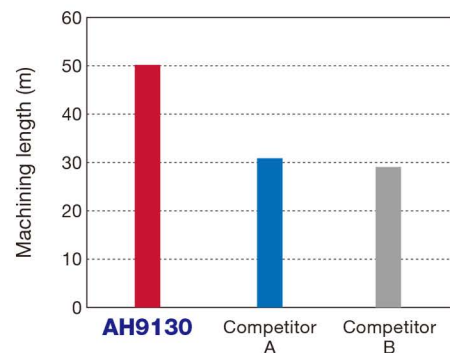
Latest coating optimized for extended tool life

AH9130 (SMP, SMF, SMC heads)

- Unique nano-multilayered coating is made possible by Tungaloy's latest coating technology, providing 3 principal features
- This coating achieves highly-balanced wear resistance and chipping resistance, also has acid resistance, resistance to dissolution, and high adhesion strength



Tool life machining carbon steel (S55C / C55)

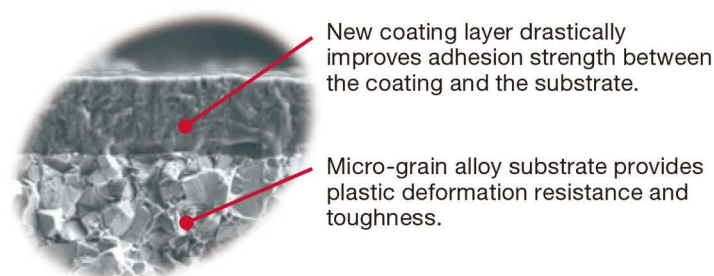


P Tool : $\phi 26$ mm
Cutting speed : $V_c = 100$ m/min
Feed : $f = 0.35$ mm/rev

AH9130 provided superior wear resistance, significantly increasing tool life. In addition, secure drill tip clamping system provided tool life stability.

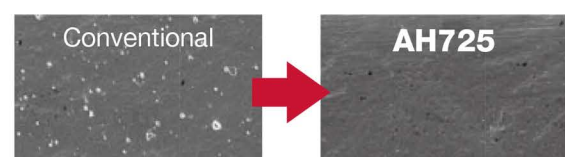
AH725 (SMP head) **PREMIUMTEC**

Reliable PVD grade is suitable for various materials



Super flash coating

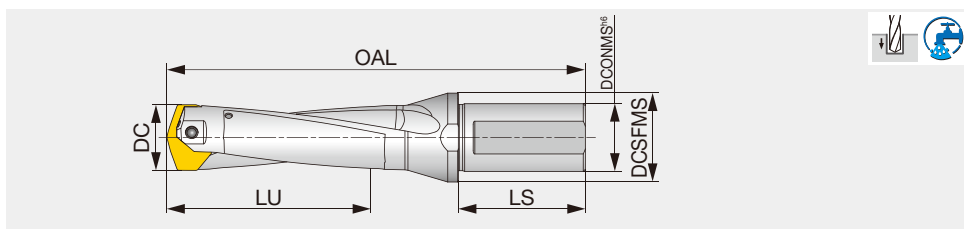
"Premiumtec" improves overall coating surface quality



DRILL BODY

TIS L/D=3

Exchangeable head drill



Designation	DC	DCONMS	DCSFMS	LU	LS	OAL			Pocket size	Head
						SMP	SMF	SMC		
TIS200F25-3	20 - 20.9	25	32	63.1	56	148.1	148.4	148.7	20	SM*20*
TIS210F25-3	21 - 21.9	25	32	66.3	56	151.1	151.4	151.7	21	SM*21*
TIS220F25-3	22 - 22.9	25	32	69.4	56	154.4	154.5	155	22	SM*22*
TIS230F25-3	23 - 23.9	25	32	72.6	56	157.4	157.5	158	23	SM*23*
TIS240F32-3	24 - 24.9	32	40	75.7	60	170.7	170.7	171.4	24	SM*24*
TIS250F32-3	25 - 25.9	32	40	78.9	60	173.7	173.7	174.4	25	SM*25*
TIS260F32-3	26 - 26.9	32	40	82	60	177	177.9	177.4	26	SM*26*
TIS270F32-3	27 - 27.9	32	40	85.2	60	180	180.9	180.4	27	SM*27*
TIS280F32-3	28 - 28.9	32	40	88.4	60	188.4	189	188.5	28	SM*28*
TIS290F32-3	29 - 29.9	32	40	91.5	60	191.4	192	191.8	29	SM*29*
TIS300F32-3	30 - 30.9	32	42	94.7	60	194.7	195.1	194.1	30	SM*30*
TIS310F32-3	31 - 31.9	32	42	97.9	60	197.7	198.1	197.4	31	SM*31*
TIS320F40-3	32 - 32.9	40	48	101	68	211	211.3	210.6	32	SM*32*
TIS330F40-3	33 - 33.9	40	48	104.2	68	214	214.3	213.9	33	SM*33*
TIS340F40-3	34 - 34.9	40	48	107.3	68	217	217.3	-	34	SM*34*
TIS350F40-3	35 - 35.9	40	48	110.4	68	220.4	220.5	-	35	SM*35*
TIS360F40-3	36 - 36.9	40	48	113.6	68	223.4	223.5	-	36	SM*36*
TIS370F40-3	37 - 37.9	40	48	116.8	68	226.4	226.5	-	37	SM*37*
TIS380F40-3	38 - 38.9	40	50	119.9	68	234.9	234.8	-	38	SM*38*
TIS390F40-3	39 - 39.9	40	50	123.1	68	237.9	237.8	-	39	SM*39*
TIS400F40-3	40 - 41	40	50	126.3	68	240.9	240.8	-	40	SM*40*

Tool diameter	Hole diameter tolerance*	- An overall length (OAL) differs based on each head geometry.
ø20 - ø29.9	+0.05 / 0	
ø30 - ø41	+0.06 / 0	

* Just for reference.

SPARE PARTS

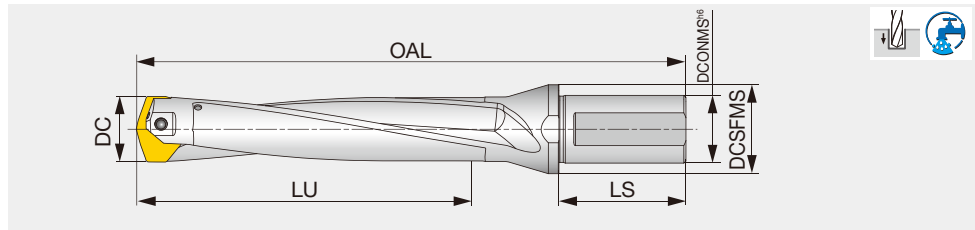


Designation	Clamping screw	Wrench	
		Torx Bit	Grip
TIS200F25-*	TS40178D25	BLDT20/S7	H-TB2W
TIS210F25-*	TS40178D25	BLDT20/S7	H-TB2W
TIS220F25-*	TS40198D28	BLDT20/S7	H-TB2W
TIS230F25-*	TS40198D28	BLDT20/S7	H-TB2W
TIS240F32-*	TS40210D3	BLDT20/S7	H-TB2W
TIS250F32-*	TS40210D3	BLDT20/S7	H-TB2W
TIS260F32-*	TS50230D3	BLDT20/S7	H-TB2W
TIS270F32-*	TS50230D3	BLDT20/S7	H-TB2W
TIS280F32-*	TS50250D35	BLDT25/S7	H-TB2W
TIS290F32-*	TS50250D35	BLDT25/S7	H-TB2W
TIS300F32-*	TS60265D4	BLDT25/S7	H-TB2W
TIS310F32-*	TS60265D4	BLDT25/S7	H-TB2W
TIS320F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS330F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS340F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS350F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS360F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS370F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS380F40-*	TS80340D6	BLDT25/S7	H-TB2W
TIS390F40-*	TS80340D6	BLDT25/S7	H-TB2W
TIS400F40-*	TS80340D6	BLDT25/S7	H-TB2W

Recommended clamping torque (N·m):
 TS40178D25 = 4.5, TS40198D28 = 4.5, TS40210D3 = 4.5,
 TS50230D3 = 5, TS50250D35 = 5.5, TS60265D4 = 6,
 TS60285D42 = 6, TS60320D5 = 6, TS80340D6 = 7

TIS L/D=5

Exchangeable head drill



Designation	DC	DCONMS	DCSFMS	LU	LS	OAL			Pocket size	Head
						SMP	SMF	SMC		
TIS200F25-5	20 - 20.9	25	32	103.1	56	188.1	188.4	188.7	20	SM*20*
TIS210F25-5	21 - 21.9	25	32	108.3	56	193.1	193.4	193.7	21	SM*21*
TIS220F25-5	22 - 22.9	25	32	113.4	56	198.4	198.5	199.1	22	SM*22*
TIS230F25-5	23 - 23.9	25	32	118.6	56	203.4	203.5	204.1	23	SM*23*
TIS240F32-5	24 - 24.9	32	40	123.7	60	218.7	218.7	219.4	24	SM*24*
TIS250F32-5	25 - 25.9	32	40	128.9	60	223.7	223.7	224.4	25	SM*25*
TIS260F32-5	26 - 26.9	32	40	134	60	229	229.9	229.4	26	SM*26*
TIS270F32-5	27 - 27.9	32	40	139.2	60	234	234.9	234.4	27	SM*27*
TIS280F32-5	28 - 28.9	32	40	144.4	60	244.4	245	244.5	28	SM*28*
TIS290F32-5	29 - 29.9	32	40	149.5	60	249.4	250	249.8	29	SM*29*
TIS300F32-5	30 - 30.9	32	42	154.7	60	254.7	255.1	254.1	30	SM*30*
TIS310F32-5	31 - 31.9	32	42	159.9	60	259.7	260.1	259.4	31	SM*31*
TIS320F40-5	32 - 32.9	40	48	165	68	275	275.3	274.6	32	SM*32*
TIS330F40-5	33 - 33.9	40	48	170.2	68	280	280.3	279.9	33	SM*33*
TIS340F40-5	34 - 34.9	40	48	175.3	68	285	285.3	-	34	SM*34*
TIS350F40-5	35 - 35.9	40	48	180.4	68	290.4	290.5	-	35	SM*35*
TIS360F40-5	36 - 36.9	40	48	185.6	68	295.4	295.5	-	36	SM*36*
TIS370F40-5	37 - 37.9	40	48	190.8	68	300.4	300.5	-	37	SM*37*
TIS380F40-5	38 - 38.9	40	50	195.9	68	310.9	310.8	-	38	SM*38*
TIS390F40-5	39 - 39.9	40	50	201.1	68	315.9	315.8	-	39	SM*39*
TIS400F40-5	40 - 41	40	50	206.3	68	320.9	320.8	-	40	SM*40*

Tool diameter	Hole diameter tolerance*	- An overall length (OAL) differs based on each head geometry.
ø20 - ø29.9	+0.08 / 0	
ø30 - ø41	+0.09 / 0	

* Just for reference.

SPARE PARTS

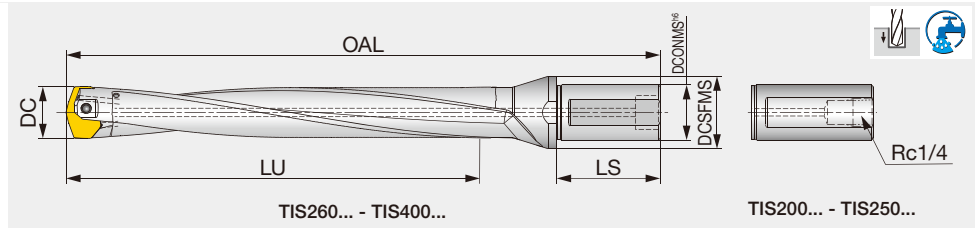


Designation	Clamping screw	Wrench	
		Torx Bit	Grip
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TIS220F25-*	TS40198D28	BLDT20/S7	H-TB2W
TIS230F25-*	TS40198D28	BLDT20/S7	H-TB2W
TIS240F32-*	TS40210D3	BLDT20/S7	H-TB2W
TIS250F32-*	TS40210D3	BLDT20/S7	H-TB2W
TIS260F32-*	TS50230D3	BLDT20/S7	H-TB2W
TIS270F32-*	TS50230D3	BLDT20/S7	H-TB2W
TIS280F32-*	TS50250D35	BLDT25/S7	H-TB2W
TIS290F32-*	TS50250D35	BLDT25/S7	H-TB2W
TIS300F32-*	TS60265D4	BLDT25/S7	H-TB2W
TIS310F32-*	TS60265D4	BLDT25/S7	H-TB2W
TIS320F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS330F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS340F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS350F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS360F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS370F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS380F40-*	TS80340D6	BLDT25/S7	H-TB2W
TIS390F40-*	TS80340D6	BLDT25/S7	H-TB2W
TIS400F40-*	TS80340D6	BLDT25/S7	H-TB2W

Recommended clamping torque (N·m):
 TS40178D25 = 4.5, TS40198D28 = 4.5, TS40210D3 = 4.5,
 TS50230D3 = 5, TS50250D35 = 5.5, TS60265D4 = 6,
 TS60285D42 = 6, TS60320D5 = 6, TS80340D6 = 7

TIS L/D=8

Exchangeable head drill



Designation	DC	DCONMS	DCSFMS	LU	LS	OAL			Pocket size	Head
						SMP	SMF	SMC		
TIS200F25-8	20 - 20.9	25	32	163.1	56	248.1	248.4	248.7	20	SM*20*
TIS210F25-8	21 - 21.9	25	32	171.3	56	256.1	256.4	256.7	21	SM*21*
TIS220F25-8	22 - 22.9	25	32	179.4	56	264.4	264.5	265	22	SM*22*
TIS230F25-8	23 - 23.9	25	32	187.6	56	272.4	272.5	273	23	SM*23*
TIS240F32-8	24 - 24.9	32	40	195.7	60	290.7	290.7	291.4	24	SM*24*
TIS250F32-8	25 - 25.9	32	40	203.9	60	298.7	298.7	299.4	25	SM*25*
TIS260F32-8	26 - 26.9	32	40	212	60	307	307.9	307.4	26	SM*26*
TIS270F32-8	27 - 27.9	32	40	220.2	60	315	315.9	315.4	27	SM*27*
TIS280F32-8	28 - 28.9	32	40	228.4	60	328.4	329	328.5	28	SM*28*
TIS290F32-8	29 - 29.9	32	40	236.5	60	336.4	337	336.8	29	SM*29*
TIS300F32-8	30 - 30.9	32	42	244.7	60	344.7	345.1	344.1	30	SM*30*
TIS310F32-8	31 - 31.9	32	42	252.9	60	352.7	353.1	352.4	31	SM*31*
TIS320F40-8	32 - 32.9	40	48	261	68	371	371.3	370.6	32	SM*32*
TIS330F40-8	33 - 33.9	40	48	269.2	68	379	379.3	378.9	33	SM*33*
TIS340F40-8	34 - 34.9	40	48	277.3	68	387	387.3	-	34	SM*34*
TIS350F40-8	35 - 35.9	40	48	285.4	68	395.4	395.5	-	35	SM*35*
TIS360F40-8	36 - 36.9	40	48	293.6	68	403.4	403.5	-	36	SM*36*
TIS370F40-8	37 - 37.9	40	48	301.8	68	411.4	411.5	-	37	SM*37*
TIS380F40-8	38 - 38.9	40	50	309.9	68	424.9	424.8	-	38	SM*38*
TIS390F40-8	39 - 39.9	40	50	318.1	68	432.9	432.8	-	39	SM*39*
TIS400F40-8	40 - 41	40	50	326.3	68	440.9	440.8	-	40	SM*40*

Tool diameter	Hole diameter tolerance*
ø20 - ø29.9	+0.08 / 0
ø30 - ø41	+0.09 / 0

- An overall length (OAL) differs based on each head geometry.

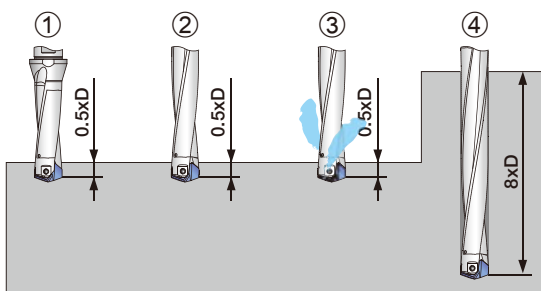
* Just for reference.

SPARE PARTS

Designation	Clamping screw	Wrench	
		Torx Bit	Grip
TIS200F25-*, TIS210F25-*	TS40178D25	BLDT20/S7	H-TB2W
TIS220F25-*, TIS230F25-*	TS40198D28	BLDT20/S7	H-TB2W
TIS240F32-*, TIS250F32-*	TS40210D3	BLDT20/S7	H-TB2W
TIS260F32-*, TIS270F32-*	TS50230D3	BLDT20/S7	H-TB2W
TIS280F32-*, TIS290F32-*	TS50250D35	BLDT25/S7	H-TB2W
TIS300F32-*, TIS310F32-*	TS60265D4	BLDT25/S7	H-TB2W
TIS320F40-*, TIS330F40-*, TIS340F40-*	TS60285D42	BLDT25/S7	H-TB2W
TIS350F40-*, TIS360F40-*, TIS370F40-*	TS60320D5	BLDT25/S7	H-TB2W
TIS380F40-*, TIS390F40-*, TIS400F40-*	TS80340D6	BLDT25/S7	H-TB2W

Recommended clamping torque:
 TS40178D25, TS40198D28, TS40210D3 = 4.5 N·m,
 TS50230D3 = 5 N·m, TS50250D35 = 5.5 N·m,
 TS60265D4, TS60285D42, TS60320D5 = 6 N·m,
 TS80340D6 = 7 N·m

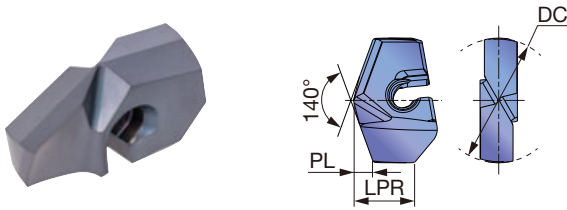
● Tips when using 8xD drills (SMP, SMF heads)



- ① Drill a pilot hole in the depth of 0.5xD (3xD drill body is recommended). The same head diameter should be used for the pre-hole and the main drilling process.
- ② Rotate the drill at a low speed (eg. 100 rpm). While maintaining the drill speed, slowly feed into the pilot hole for several millimeters from the entry.
- ③ Activate the internal coolant and increase the drill rotation to the required speed.
- ④ Drill to the required depth using the recommended cutting parameters.

DRILL HEAD

SMP (General purpose)



P	Steel	★	★
M	Stainless	★	★
K	Cast iron	★	★
N	Non-ferrous	☆	☆
S	Superalloys	☆	☆
H	Hard materials	☆	★

★ : First choice
☆ : Second choice

Designation	DC	LPR	Coated		PL	Pocket size	Body
			AH9130	AH725			
SMP200	20	9.65	●	●	3.11	20	TIS200F25-*
SMP201	20.1	9.61	●	●	3.13	20	TIS200F25-*
SMP203	20.3	9.52	●	●	3.16	20	TIS200F25-*
SMP205	20.5	9.44	●	●	3.2	20	TIS200F25-*
SMP206	20.6	9.4	●	●	3.22	20	TIS200F25-*
SMP210	21	9.23	●	●	3.29	21	TIS210F25-*
SMP213	21.3	9.1	●	●	3.35	21	TIS210F25-*
SMP215	21.5	9.02	●	●	3.38	21	TIS210F25-*
SMP220	22	10.54	●	●	3.42	22	TIS220F25-*
SMP222	22.2	10.46	●	●	3.46	22	TIS220F25-*
SMP223	22.3	10.41	●	●	3.47	22	TIS220F25-*
SMP225	22.5	10.33	●	●	3.51	22	TIS220F25-*
SMP230	23	10.12	●	●	3.6	23	TIS230F25-*
SMP235	23.5	9.91	●	●	3.69	23	TIS230F25-*
SMP238	23.8	9.78	●	●	3.75	23	TIS230F25-*
SMP240	24	10.76	●	●	3.73	24	TIS240F32-*
SMP245	24.5	10.55	●	●	3.82	24	TIS240F32-*
SMP247	24.7	10.47	●	●	3.86	24	TIS240F32-*
SMP250	25	10.34	●	●	3.91	25	TIS250F32-*
SMP255	25.5	10.13	●	●	4	25	TIS250F32-*
SMP260	26	11.55	●	●	4.04	26	TIS260F32-*
SMP261	26.1	11.51	●	●	4.06	26	TIS260F32-*
SMP262	26.2	11.47	●	●	4.08	26	TIS260F32-*
SMP263	26.3	11.42	●	●	4.09	26	TIS260F32-*
SMP264	26.4	11.38	●	●	4.11	26	TIS260F32-*
SMP265	26.5	11.34	●	●	4.13	26	TIS260F32-*
SMP266	26.6	11.3	●	●	4.15	26	TIS260F32-*
SMP267	26.7	11.26	●	●	4.17	26	TIS260F32-*
SMP270	27	11.13	●	●	4.22	27	TIS270F32-*
SMP271	27.1	11.09	●	●	4.24	27	TIS270F32-*
SMP272	27.2	11.05	●	●	4.26	27	TIS270F32-*
SMP273	27.3	11	●	●	4.28	27	TIS270F32-*
SMP275	27.5	10.92	●	●	4.31	27	TIS270F32-*
SMP276	27.6	10.88	●	●	4.33	27	TIS270F32-*
SMP279	27.9	10.75	●	●	4.39	27	TIS270F32-*
SMP280	28	11.74	●	●	4.35	28	TIS280F32-*
SMP281	28.1	11.7	●	●	4.37	28	TIS280F32-*
SMP283	28.3	11.61	●	●	4.4	28	TIS280F32-*
SMP285	28.5	11.53	●	●	4.44	28	TIS280F32-*
SMP286	28.6	11.49	●	●	4.46	28	TIS280F32-*
SMP290	29	11.32	●	●	4.53	29	TIS290F32-*
SMP291	29.1	11.28	●	●	4.55	29	TIS290F32-*

Tool diameter	Head diameter tolerance
ø20 - ø29.9	+0.014 / -0.015
ø30 - ø41	+0.014 / -0.02

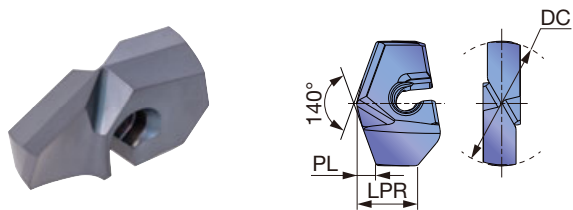
P	Steel	★	★
M	Stainless	★	★
K	Cast iron	★	★
N	Non-ferrous	☆	☆
S	Superalloys	☆	☆
H	Hard materials	☆	★

★ : First choice
☆ : Second choice

Designation	DC	LPR	Coated		PL	Pocket size	Body
			AH9130	AH725			
SMP293	29.3	11.19	●	●	4.59	29	TIS290F32-*
SMP295	29.5	11.11	●	●	4.62	29	TIS290F32-*
SMP296	29.6	11.07	●	●	4.64	29	TIS290F32-*
SMP297	29.7	11.03	●	●	4.66	29	TIS290F32-*
SMP298	29.8	10.98	●	●	4.68	29	TIS290F32-*
SMP299	29.9	10.94	●	●	4.7	29	TIS290F32-*
SMP300	30	14.14	●	●	4.67	30	TIS300F32-*
SMP301	30.1	14.1	●	●	4.69	30	TIS300F32-*
SMP302	30.2	14.06	●	●	4.71	30	TIS300F32-*
SMP303	30.3	14.01	●	●	4.72	30	TIS300F32-*
SMP304	30.4	13.97	●	●	4.74	30	TIS300F32-*
SMP305	30.5	13.93	●	●	4.76	30	TIS300F32-*
SMP307	30.7	13.85	●	●	4.8	30	TIS300F32-*
SMP308	30.8	13.8	●	●	4.82	30	TIS300F32-*
SMP310	31	13.72	●	●	4.85	31	TIS310F32-*
SMP311	31.1	13.68	●	●	4.87	31	TIS310F32-*
SMP313	31.3	13.59	●	●	4.91	31	TIS310F32-*
SMP315	31.5	13.51	●	●	4.94	31	TIS310F32-*
SMP318	31.8	13.38	●	●	5	31	TIS310F32-*
SMP320	32	14.53	●	●	4.98	32	TIS320F40-*
SMP321	32.1	14.49	●	●	5	32	TIS320F40-*
SMP322	32.2	14.45	●	●	5.02	32	TIS320F40-*
SMP325	32.5	14.32	●	●	5.07	32	TIS320F40-*
SMP328	32.8	14.19	●	●	5.13	32	TIS320F40-*
SMP330	33	14.11	●	●	5.16	33	TIS330F40-*
SMP331	33.1	14.07	●	●	5.18	33	TIS330F40-*
SMP333	33.3	13.98	●	●	5.22	33	TIS330F40-*
SMP335	33.5	13.9	●	●	5.25	33	TIS330F40-*
SMP339	33.9	13.73	●	●	5.33	33	TIS330F40-*
SMP340	34	13.69	●	●	5.34	34	TIS340F40-*
SMP341	34.1	13.65	●	●	5.36	34	TIS340F40-*
SMP343	34.3	13.56	●	●	5.4	34	TIS340F40-*
SMP345	34.5	13.48	●	●	5.44	34	TIS340F40-*
SMP349	34.9	13.31	●	●	5.51	34	TIS340F40-*
SMP350	35	16.56	●	●	5.44	35	TIS350F40-*
SMP351	35.1	16.52	●	●	5.46	35	TIS350F40-*
SMP352	35.2	16.48	●	●	5.48	35	TIS350F40-*
SMP355	35.5	16.35	●	●	5.53	35	TIS350F40-*
SMP357	35.7	16.27	●	●	5.57	35	TIS350F40-*
SMP360	36	16.14	●	●	5.62	36	TIS360F40-*

● : Line up
Package quantity = 1 pc

SMP (General purpose)



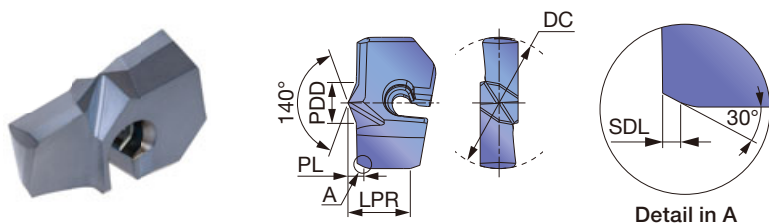
		★	★		
P	Steel	★	★	Tool diameter	Head diameter tolerance
M	Stainless	★	★	ø20 - ø29.9	+0.014 / -0.015
K	Cast iron	★	★	ø30 - ø41	+0.014 / -0.02
N	Non-ferrous	☆	☆		
S	Superalloys	☆	★		
H	Hard materials	☆	★		

★ : First choice
☆ : Second choice

Designation	DC	LPR	Coated		PL	Pocket size	Body
			AH9130	AH725			
SMP361	36.1	16.1	●	●	5.64	36	TIS360F40-*
SMP362	36.2	16.06	●	●	5.66	36	TIS360F40-*
SMP365	36.5	15.93	●	●	5.71	36	TIS360F40-*
SMP366	36.6	15.89	●	●	5.73	36	TIS360F40-*
SMP370	37	15.72	●	●	5.8	37	TIS370F40-*
SMP371	37.1	15.68	●	●	5.82	37	TIS370F40-*
SMP373	37.3	15.59	●	●	5.86	37	TIS370F40-*
SMP374	37.4	15.55	●	●	5.88	37	TIS370F40-*
SMP375	37.5	15.51	●	●	5.9	37	TIS370F40-*
SMP380	38	17	●	●	5.91	38	TIS380F40-*
SMP381	38.1	16.96	●	●	5.93	38	TIS380F40-*
SMP383	38.3	16.87	●	●	5.96	38	TIS380F40-*
SMP385	38.5	16.79	●	●	6	38	TIS380F40-*
SMP388	38.8	16.66	●	●	6.06	38	TIS380F40-*
SMP390	39	16.58	●	●	6.09	39	TIS390F40-*
SMP391	39.1	16.54	●	●	6.11	39	TIS390F40-*
SMP395	39.5	16.37	●	●	6.18	39	TIS390F40-*
SMP397	39.7	16.29	●	●	6.22	39	TIS390F40-*
SMP398	39.8	16.24	●	●	6.24	39	TIS390F40-*
SMP400	40	16.16	●	●	6.27	40	TIS400F40-*
SMP401	40.1	16.12	●	●	6.29	40	TIS400F40-*
SMP402	40.2	16.08	●	●	6.31	40	TIS400F40-*
SMP403	40.3	16.03	●	●	6.33	40	TIS400F40-*
SMP405	40.5	15.95	●	●	6.37	40	TIS400F40-*
SMP408	40.8	15.82	●	●	6.42	40	TIS400F40-*
SMP410	41	15.74	●	●	6.46	40	TIS400F40-*

● : Line up
Package quantity = 1 pc

SMF (Flat geometry head)



P	Steel	★
M	Stainless	★
K	Cast iron	★
N	Non-ferrous	☆
S	Superalloys	★
H	Hard materials	★

★ : First choice
☆ : Second choice

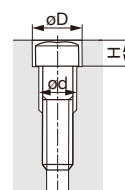
Tool diameter	Head diameter tolerance
ø20 - ø29.9	+0.014 / -0.015
ø30 - ø41	+0.014 / -0.02

Designation	DC	LPR	Coated		SDL	PL	PDD	Pocket size	Body
			AH9130						
SMF200	20	9.82	●		0.7	2.18	8.3	20	TIS200F25-*
SMF205	20.5	9.61	●		0.7	2.18	8.3	20	TIS200F25-*
SMF210	21	9.4	●		0.7	2.18	8.3	21	TIS210F25-*
SMF215	21.5	9.19	●		0.7	2.18	8.3	21	TIS210F25-*
SMF220	22	10.56	●		0.7	2.38	9	22	TIS220F25-*
SMF225	22.5	10.35	●		0.7	2.38	9	22	TIS220F25-*
SMF227	22.7	10.27	●		0.7	2.38	9	22	TIS220F25-*
SMF230	23	10.14	●		0.7	2.38	9	23	TIS230F25-*
SMF235	23.5	9.93	●		0.7	2.38	9	23	TIS230F25-*
SMF238	23.8	9.8	●		0.7	2.38	9	23	TIS230F25-*
SMF240	24	10.63	●		0.7	2.52	10	24	TIS240F32-*
SMF242	24.2	10.55	●		0.7	2.52	10	24	TIS240F32-*
SMF245	24.5	10.42	●		0.7	2.52	10	24	TIS240F32-*
SMF250	25	10.21	●		0.7	2.52	10	25	TIS250F32-*
SMF255	25.5	10	●		0.7	2.52	10	25	TIS250F32-*
SMF260	26	12.32	●		0.7	2.48	10.5	26	TIS260F32-*
SMF265	26.5	12.11	●		0.7	2.48	10.5	26	TIS260F32-*
SMF270	27	11.9	●		0.7	2.48	10.5	27	TIS270F32-*
SMF275	27.5	11.69	●		0.7	2.48	10.5	27	TIS270F32-*
SMF280	28	12.28	●		0.7	2.72	11.6	28	TIS280F32-*
SMF290	29	11.86	●		0.7	2.72	11.6	29	TIS290F32-*
SMF295	29.5	11.65	●		0.7	2.72	11.6	29	TIS290F32-*
SMF296	29.6	11.61	●		0.7	2.72	11.6	29	TIS290F32-*
SMF300	30	14.46	●		0.7	2.8	12.4	30	TIS300F32-*
SMF310	31	14.04	●		0.7	2.8	12.4	31	TIS310F32-*
SMF315	31.5	13.83	●		0.7	2.8	12.4	31	TIS310F32-*
SMF320	32	14.76	●		0.7	3.13	13.6	32	TIS320F40-*
SMF325	32.5	14.55	●		0.7	3.13	13.6	32	TIS320F40-*
SMF330	33	14.34	●		0.7	3.13	13.6	33	TIS330F40-*
SMF340	34	13.92	●		0.7	3.13	13.6	34	TIS340F40-*
SMF345	34.5	13.71	●		0.7	3.13	13.6	34	TIS340F40-*
SMF350	35	16.54	●		0.7	3.31	14.6	35	TIS350F40-*
SMF355	35.5	16.33	●		0.7	3.31	14.6	35	TIS350F40-*
SMF360	36	16.12	●		0.7	3.31	14.6	36	TIS360F40-*
SMF365	36.5	15.91	●		0.7	3.31	14.6	36	TIS360F40-*
SMF370	37	15.7	●		0.7	3.31	14.6	37	TIS370F40-*
SMF380	38	16.85	●		0.7	3.49	15.9	38	TIS380F40-*
SMF390	39	16.43	●		0.7	3.49	15.9	39	TIS390F40-*
SMF400	40	16.01	●		0.7	3.49	15.9	40	TIS400F40-*
SMF402	40.2	15.93	●		0.7	3.49	15.9	40	TIS400F40-*
SMF410	41	15.59	●		0.7	3.49	15.9	40	TIS400F40-*

No drill body modification is needed when mounting SMF drill head.
Do not regrind. SMF drill heads are not designed for re-use after regrind.

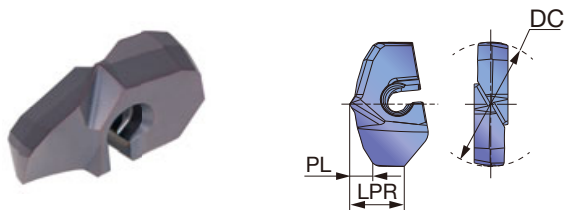
● : Line up
Package quantity = 1 pc

Counterbore dimensions for bolt holes



Thread size	M16	M20	M22	M24
øD (mm)	26	32	35	39
H (mm)	17.5	21.5	23.5	25.5
ød (mm)	18	22	24	26
Applicable tool	SMF260	SMF320	SMF350	SMF390

SMC (High precision drilling)



P	Steel	★	
M	Stainless		
K	Cast iron	★	
N	Non-ferrous		
S	Superalloys		
H	Hard materials	☆	

Tool diameter	Head diameter tolerance
ø20 - ø33	+0.025 / 0

★ : First choice
☆ : Second choice

Designation	DC	LPR	Coated		PL	Pocket size	Body
			AH9130				
New SMC200	20	10.5	●		5.38	20	TIS200F25-*
New SMC201	20.1	10.4	●		5.40	20	TIS200F25-*
New SMC203	20.3	10.3	●		5.44	20	TIS200F25-*
New SMC205	20.5	10.3	●		5.48	20	TIS200F25-*
New SMC210	21	10	●		5.59	21	TIS210F25-*
New SMC211	21.1	10	●		5.61	21	TIS210F25-*
New SMC215	21.5	9.8	●		5.69	21	TIS210F25-*
New SMC220	22	11.4	●		5.75	22	TIS220F25-*
New SMC222	22.2	11.3	●		5.79	22	TIS220F25-*
New SMC225	22.5	11.2	●		5.85	22	TIS220F25-*
New SMC228	22.8	11.1	●		5.91	22	TIS220F25-*
New SMC230	23	11	●		5.96	23	TIS230F25-*
New SMC235	23.5	10.8	●		6.06	23	TIS230F25-*
New SMC240	24	11.7	●		6.35	24	TIS240F32-*
New SMC242	24.2	11.6	●		6.39	24	TIS240F32-*
New SMC243	24.3	11.6	●		6.41	24	TIS240F32-*
New SMC245	24.5	11.5	●		6.45	24	TIS240F32-*
New SMC247	24.7	11.4	●		6.49	24	TIS240F32-*
New SMC250	25	11.3	●		6.55	25	TIS250F32-*
New SMC255	25.5	11.1	●		6.65	25	TIS250F32-*
New SMC259	25.9	10.9	●		6.73	25	TIS250F32-*
SMC260	26	13.78	●		6.26	26	TIS260F32-*
SMC265	26.5	13.73	●		6.35	26	TIS260F32-*
SMC267	26.7	13.71	●		6.39	26	TIS260F32-*
SMC270	27	13.73	●		6.43	27	TIS270F32-*
SMC275	27.5	13.69	●		6.52	27	TIS270F32-*
SMC280	28	14.15	●		6.48	28	TIS280F32-*
SMC290	29	14.24	●		6.62	29	TIS290F32-*
SMC300	30	16.78	●		6.67	30	TIS300F32-*
SMC310	31	16.66	●		6.84	31	TIS310F32-*
SMC315	31.5	16.62	●		6.93	31	TIS310F32-*
SMC320	32	17.34	●		6.94	32	TIS320F40-*
SMC330	33	17.2	●		7.1	33	TIS330F40-*

No drill body modification is needed when mounting SMC drill head.
Do not regrind. SMC drill heads are not designed for re-use after regrind.

● : New product
● : Line up
Package quantity = 1 pc

STANDARD CUTTING CONDITIONS

SMP / SMF

ISO	Workpiece materials	Cutting speed Vc (m/min)	Feed: f (mm/rev)		
			ø20 - ø29.9	ø30 - ø35.9	ø36 - ø41
P	Low carbon steel S15C, S20C, etc. C15E4, etc.	80 - 140	0.2 - 0.5	0.2 - 0.5	0.2 - 0.55
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	80 - 130	0.2 - 0.5	0.2 - 0.5	0.2 - 0.55
	Prehardened steel NAK80, PX5, etc.	50 - 100	0.2 - 0.5	0.2 - 0.5	0.2 - 0.55
M	Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.	40 - 80	0.15 - 0.3	0.2 - 0.3	0.2 - 0.35
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.	80 - 180	0.25 - 0.55	0.25 - 0.55	0.3 - 0.6
	Ductile cast iron FCD400, FCD600, etc. 400-15, 600-3, etc.	80 - 140	0.25 - 0.55	0.25 - 0.55	0.3 - 0.6
N	Non ferrous materials	100 - 200	0.4 - 0.6	0.4 - 0.6	0.5 - 0.7
S	Heat-resistant alloys Inconel718, etc.	20 - 50	0.1 - 0.2	0.1 - 0.2	0.1 - 0.25
	Titanium alloys Ti-6Al-4V, etc.	20 - 50	0.1 - 0.2	0.1 - 0.2	0.1 - 0.25
H	Hardened materials	20 - 60	0.1 - 0.2	0.1 - 0.2	0.1 - 0.25

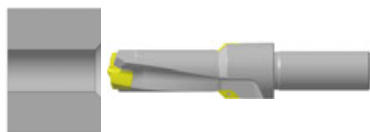
SMC

ISO	Workpiece materials	Cutting speed Vc (m/min)	Feed: f (mm/rev)
			ø20 - ø33
P	Low carbon steel S15C, S20C, etc. C15E4, etc.	80 - 140	0.2 - 0.5
	Carbon steel and alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc.	80 - 130	0.2 - 0.5
	Prehardened steel NAK80, PX5, etc.	50 - 100	0.2 - 0.5
K	Grey cast iron FC250, FC300, etc. 250, 300, etc.	80 - 180	0.25 - 0.55
	Ductile cast iron FCD400, FCD600, etc. 400-15, 600-3, etc.	80 - 140	0.25 - 0.55
H	Hardened materials	20 - 60	0.1 - 0.2

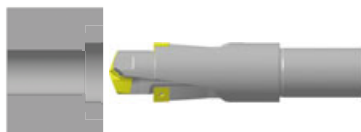
TAILOR MADE DRILL BODY

Special drill bodies featuring chamfering or counter boring capabilities with indexable insert and head. Reduce down time and tool management compared to solid drills.

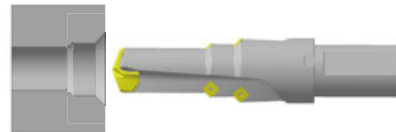
Drilling + Chamfering



Drilling + Boring



Drilling + Double chamfering



TECHNICAL GUIDE

How to change drill head

- Caution when installing the drill head

Install the drill head so that the arrow etched on it faces the arrow on the drill body.

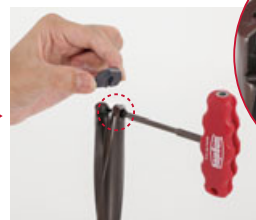


- Tightening and loosening of insert clamping screw

To unclamp rotate the screw 3-5 times counter-clockwise.



No need to remove the screw from the body.



Please replace the screw with a new one if it does not rotate smoothly.

Application range and recommended tool lengths for application irregularities

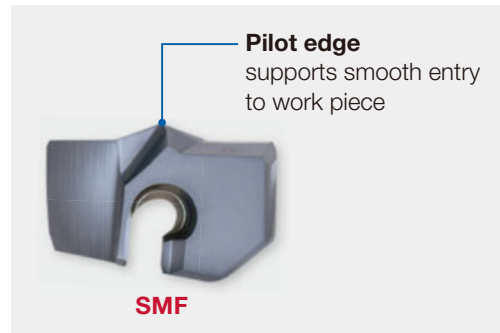
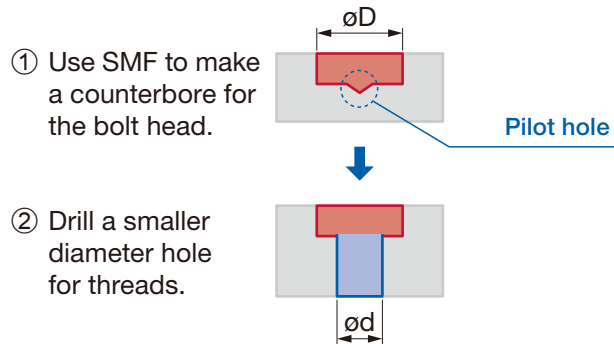
Please use the shortest tool length possible.

Application	Stacked plate	Irregular exit	Rough / cast surface	Inclined surface	OK
DRILLFORCE-MASTER	✓	✓ Up to 8xD	✓ Up to 5xD	✓ Up to 3xD	
Application	Curved surface	Overlapping holes	Plunging	Boring	
DRILLFORCE-MASTER	✓ Up to 3xD	✓ Up to 3xD	✓ Up to 3xD	✓ Up to 3xD	

● Drilling of step holes

- Follow the procedures outlined below for efficient drilling of step holes.
- SMF drill head creates a small divot in the center of the hole bottom. The divot will then pilot a drill used in the following process to create a concentric hole.

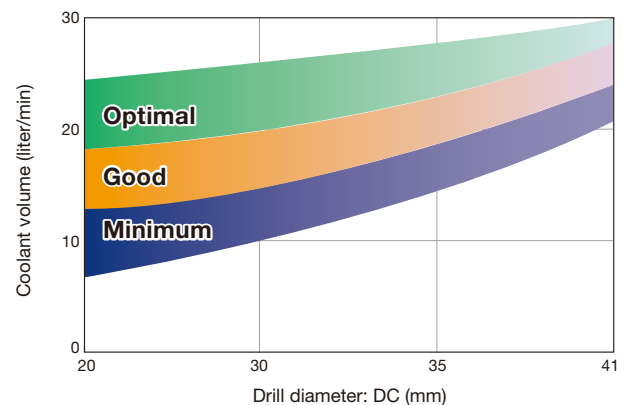
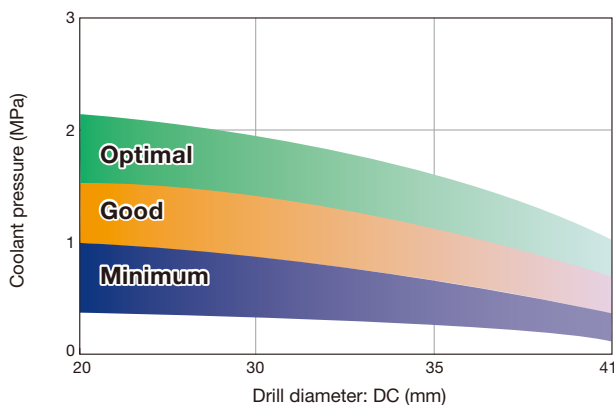
Recommended procedures



● When using for boring operations

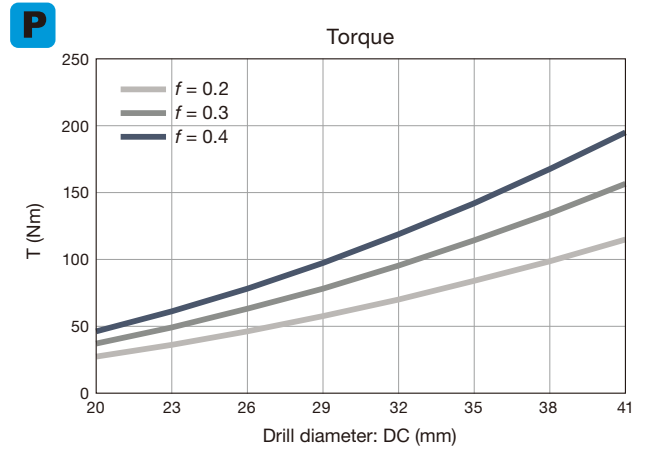
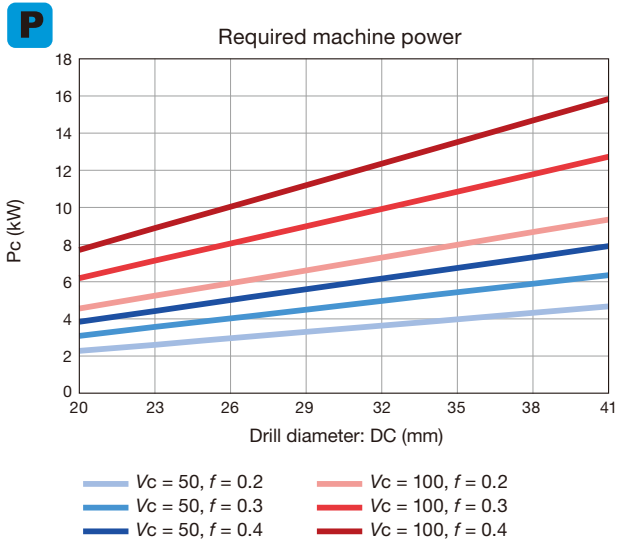
- The above procedures can also be used for boring operations.
- For boring operations, use SMF drill head with flat edges.
- The SMF drill head may produce long chips during continuous cuts. To ensure proper chip evacuation, use a dwell or pecking method.

● Recommended coolant pressure and volume



Note: External coolant will also do. For holes exceeding 2xD depth, use dwelling or peck drilling method to promote smooth chip evacuation.

● Required machine power and torque



Please access "**Tungaloy machining power**" to calculate more detailed cutting forces.

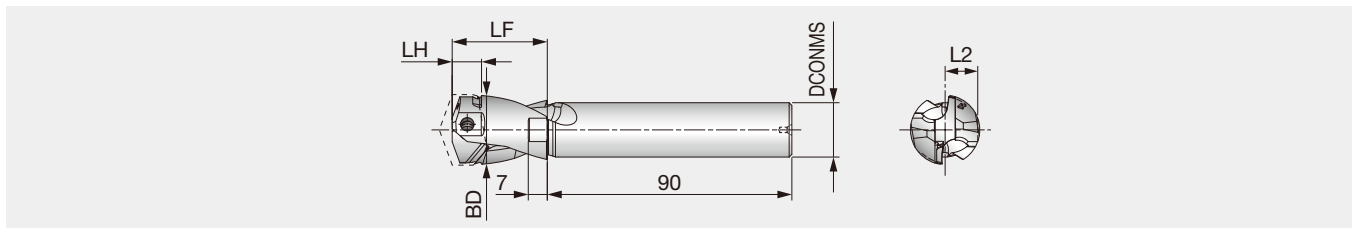


For more information

REGRINDING HOLDER

SMP-GH

Regrinding holder for SMP drill heads



Designation	DCONMS	BD	LF	LH	L2	Pocket size	Head
SMP260-279-GH	20	25.5	35	10.8	12	26, 27	SMP260-SMP279
SMP280-299-GH	20	27.5	35	10.8	13	28, 29	SMP280-SMP299
SMP300-319-GH	20	29.5	35	13	14	30, 31	SMP300-SMP319
SMP320-349-GH	20	31.5	35	13	15	32, 33, 34	SMP320-SMP349
SMP350-379-GH	20	34.5	40	14.7	16.5	35, 36, 37	SMP350-SMP379
SMP380-410-GH	20	37.5	40	15.1	18	38, 39, 40	SMP380-SMP410

● Cautions when regrounding SMP drill heads

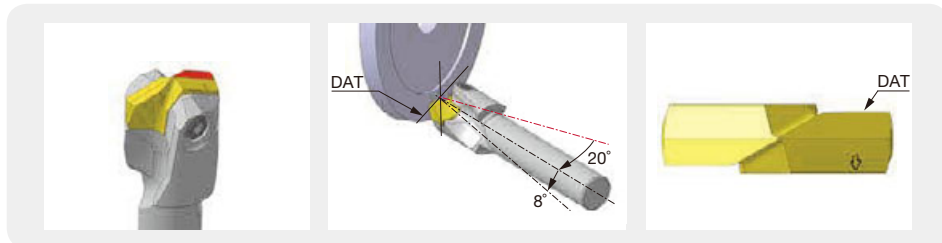
Note: SMF and SMC drill heads are not recommended to be reground due to little regrounding allowance.

① Clamping

- Assemble the drill head on the regrounding holder or shortest standard holder (3xD)
- Set-up the drill head in the machine : Total run-out must be less than 0.02 mm

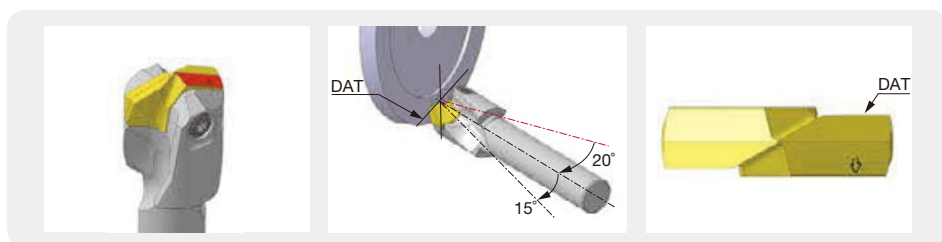
② Grinding the 1st clearance angle

- Set the drill for point angle (140°) and 1st clearance angle (8°)
- Keep the cutting edge in the horizontal plane



③ Grinding the 2nd clearance angle

- Set the drill for 2nd clearance angle (15°)



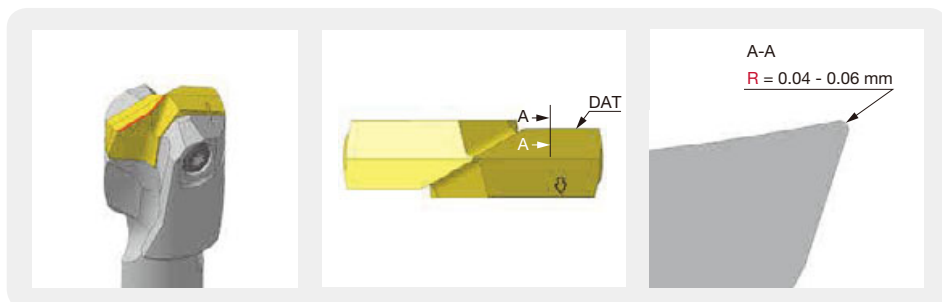
④ Grinding the chisel (Thinning)

- Set the drill for thinning angle (35°) with reference to drill axis and angle (30°) with reference to radial axis
- Keep the chisel thickness (0.14 - 0.20) and the thinning point must be over the center line

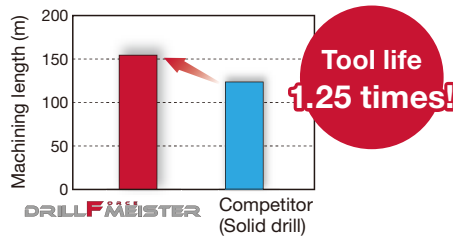
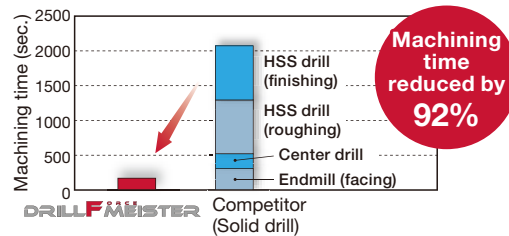
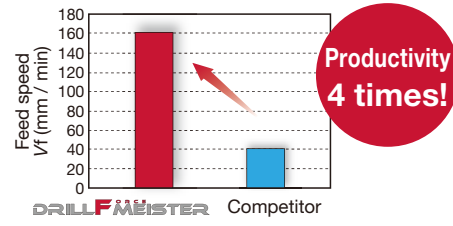
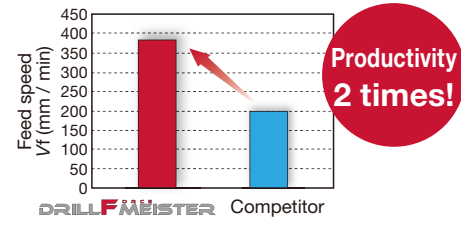


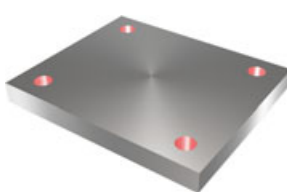
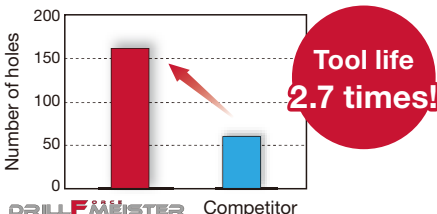
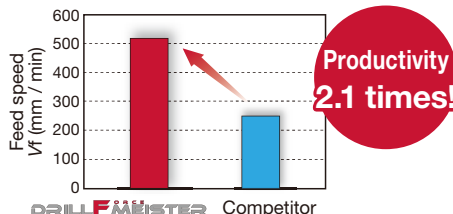
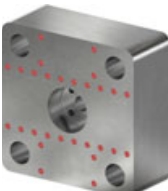
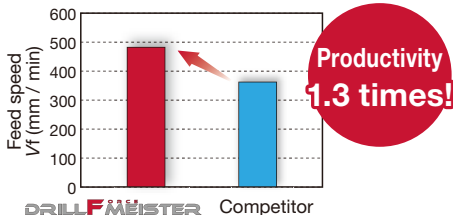
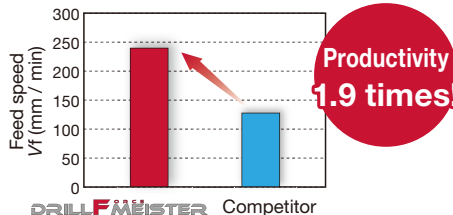
⑤ Edge preparation (Honing)

- Cutting edges should have honing by sand or brush (0.04 - 0.06 mm)
- Nega-land by diamond hand lapper is also available
- The width of honing must be uniform with good surface finish



PRACTICAL EXAMPLES

Workpiece type		H Beam	Die
Drill		TIS240F32-3	TIS320F40-5
Head		SMP240	SMF320
Grade		AH725	AH9130
Workpiece material		SN490B	FCD600 / 600-3
			
Cutting conditions	Cutting speed: V_c (m/min)	85	80
	Feed : f (mm/rev)	0.25	0.3
	Feed speed : V_f (mm/min)	262	239
	Hole depth : H (mm)	44	140
	Machine	Special machine for H Beam	Vertical M/C (BT50)
Results		 Thanks to the rigid head clamping system, DrillForce-Meister eliminated vibration and improved stability when drilling thin-walled H-beams, increasing tool life by 1.25 times.	 DrillForce-Meister's SMF flat-head drill provided stable entry into uneven cast surfaces, enabling the integration of multiple drilling operations into a single process. As a result, productivity increased by 8 times.
Workpiece type		Gate valve	Slewing ring
Drill		TIS300F40-5	TIS330F40-5
Head		SMP300	SMP331
Grade		AH725	AH725
Workpiece material		SUS304 / X5CrNi18-9	SCM440 / 42CrMo4
			
Cutting conditions	Cutting speed: V_c (m/min)	60	100
	Feed : f (mm/rev)	0.25	0.4
	Feed speed : V_f (mm/min)	160	380
	Hole depth : H (mm)	120	150
	Machine	Horizontal M/C	Vertical M/C
Results		 DrillForce-Meister provides 4 times productivity than HSS drill.	 DrillForce-Meister provides 2 times productivity and more stable hole diameter compare with indexable drill.

Workpiece type		Link	Plate
Drill		TIS320F40-5	TIS260F32-3
Head		SMP321	SMP260
Grade		AH725	AH725
Workpiece material		SCM440 / 42CrMo4	SN490B
		 P	 P
Cutting conditions	Cutting speed: V_c (m/min)	60	120
	Feed : f (mm/rev)	0.15	0.35
	Feed speed : V_f (mm/min)	90	514
	Hole depth : H (mm)	43	22
	Machine	Horizontal M/C	Vertical M/C
Results		 DrillForce-Meister provides 2.7 times tool life compared with the competitors head changeable drill.	 DrillForce-Meister provides 2.1 times productivity than indexable drill.
Workpiece type		Hydraulic valve manifold block	Machine part
Drill		TIS260F32-8	TIS200F25-5 + long arbor
Head		SMC265	New SMC200
Grade		AH9130	AH9130
Workpiece material		S690QL	FCD600 / 600-3
		 P	 K
Cutting conditions	Cutting speed: V_c (m/min)	100	60
	Feed : f (mm/rev)	0.4	0.25
	Feed speed : V_f (mm/min)	481	239
	Hole depth : H (mm)	100	59.5
	Machine	Horizontal M/C	Horizontal M/C
Results		 With secure drill head clamping design and excellent drill engagement with the materials, DrillForce-Meister SMC head offered 1.3 times better feed speed.	 With secure drill head clamping design and excellent drill engagement with the materials, DrillForce-Meister SMC head offered 1.9 times better feed speed.

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mgt

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