DrillLine

DRILLFORCE MEISTER

www.tungaloyamerica.com

Tungaloy Report No. 509-US

DRILLFORCE-MEISTER

Head-changeable drill
for drilling large holes

Member IMC Group

Tungaloy


ACCELERATED MACHINING

DrillLine

DRILLFORCE MEISTER

TUNGALOY

TUNG FORCE DRILL

ACCELERATED MACHINING

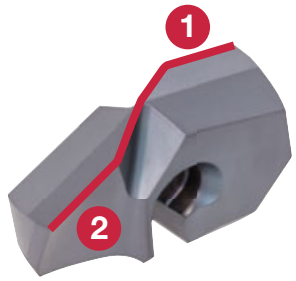
Unique clamping concept and two effective cutting edges on the drill head provide excellent hole quality and high productivity

DRILLFORCE MEISTER
TUNGALOY

Improves productivity and reliability in heavy drilling with unique drill head and clamping concept

Two effective cutting edges

- The drill head with two effective cutting edges provides high productivity and reliability



Optimized drill body

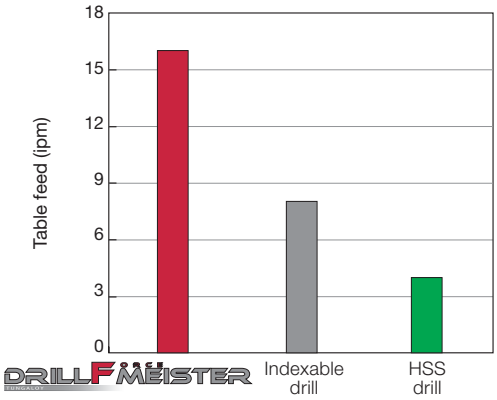
- The drill body has an optimized flute design for smooth chip evacuation and enhanced stiffness

Unique clamping system

Easy and quick yet rigid and reliable clamping method for excellent hole quality and long tool life

- The drill head change is possible without removing the drill body from the tool holder or the spindle, eliminating re-adjustments
- Asymmetric shaped drill head not only secures stability in heavy machining but also error-proofs drill head installation
- The drill body has a wide supporting area for the drill head for rigid insert clamping
- By replacing the head screw regularly, the drill body can be used for an even longer period

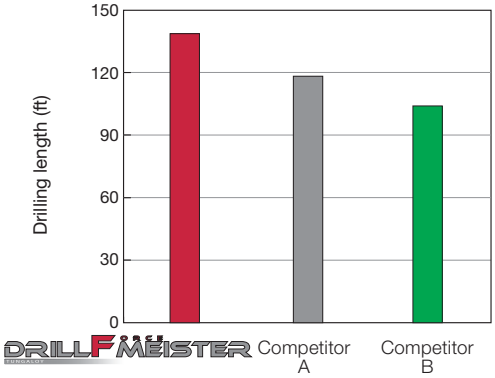
High productivity



Drill : ø1.299", L/D = 5
Workpiece material : 1055

	Cutting speed *Vc* (sfm)	Feed *f* (ipr)	Feed speed *Vf* (ipm)
DRILLFMEISTER	330	0.016	17
Indexable drill	492	0.006	9.5
HSS drill	66	0.016	3.35

AH725, a highly reliable PVD grade



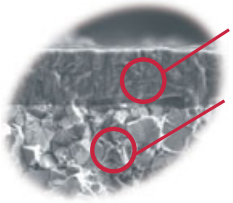
Drill : ø1.024"
Workpiece material : 1055
Cutting speed : *Vc* = 328 sfm
Feed : *f* = 0.014 ipr
Drilling depth : *H* = 4.724"

AH725 achieves smooth and flat coating surface to improve resistance to build-up edge and chipping, thus extending tool life in heavy machining.

An smart combination of optimized edge preparation and dedicated PVD grade extends tool life in heavy drilling

AH725, a highly reliable PVD grade

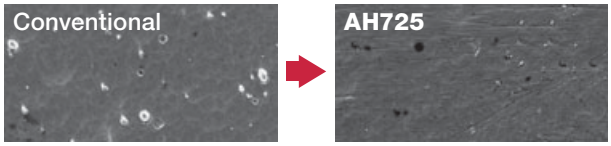
AH725 PREMIUMTEC TUNGALOY



Improved coating adhesion

Sub-micron grain carbide substrate with superior toughness and resistance to plastic-deformation

Super-flash coating:
Eliminates droplets on the surface



Optimized edge preparation

- Enlarged images of the edges before use

The cutting edge is honed to enhance coating adhesion

Competitor

CUTTING PERFORMANCE

Hole size

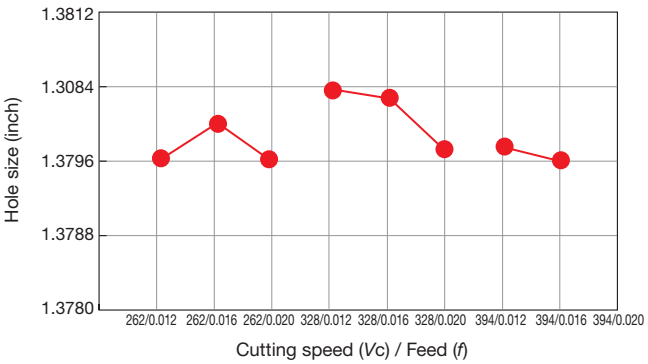
DRILLFORCE MEISTER

The hole size is stable in various cutting conditions and materials

Drill	: TISU1378F1500-5 (ø1.378")
Head	: SMP350
Grade	: AH725
Workpiece material	: 4140, S30400
Cutting speed	: *Vc* = 262 - 394 sfm (4140)
	Vc = 131 - 230 sfm (S30400)
Feed	: *f* = 0.012 - 0.020 ipr (4140)
	f = 0.008 - 0.012 ipr (S30400)
Drilling depth	: *H* = 3.937"
Machine	: Horizontal M/C (CAT50)
Coolant	: Wet (Internal)

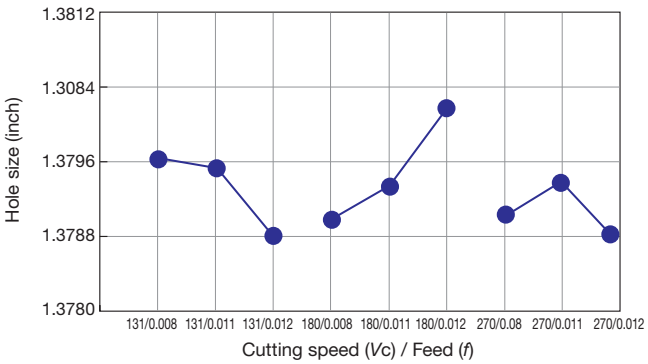
P

Hole size: 1.3794" ~ 1.3802"



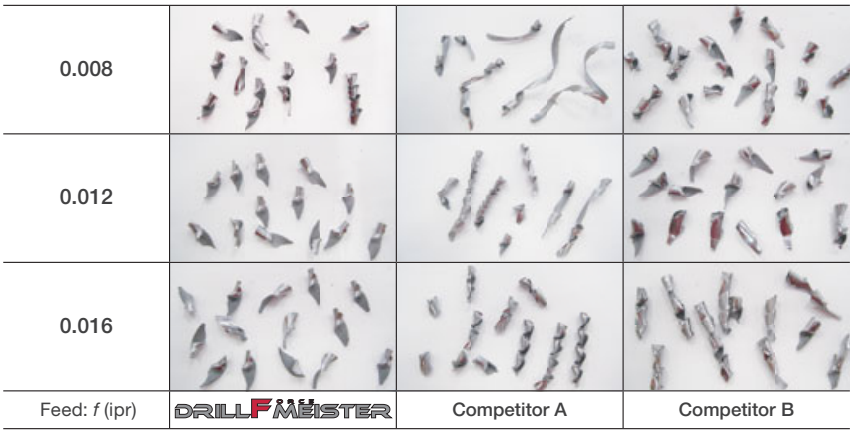
M

Hole size: 1.3788" ~ 1.3800"



Chip control

DrillForceMeister provides good chip control even in drilling low carbon steel

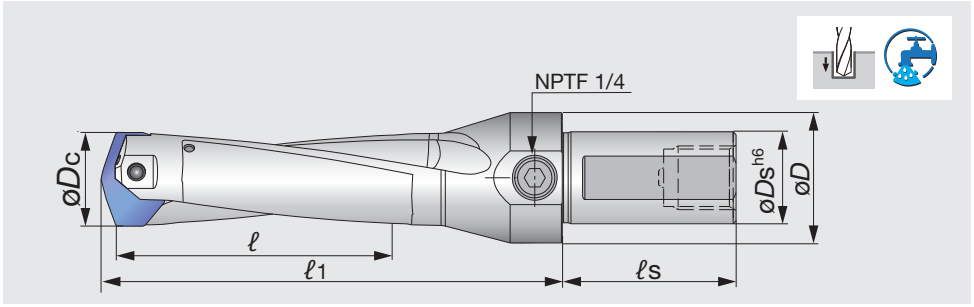


Drill	: TISU1024F1250-5 (ø1.024")
Head	: SMP260
Grade	: AH725
Workpiece material	: Low carbon steel
Cutting speed	: *Vc* = 328 sfm
Feed	: *f* = 0.008 - 0.016 ipr
Drilling depth	: *H* = 3.94"
Machine	: Horizontal M/C (CAT50)
Coolant	: Wet (Internal)

Head indexable large drill

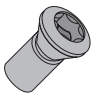
DRILL - L/D = 3

DrillForceMeister TIS L/D =3



Designation	øDc min	øDc max	øDs	øD	ℓ	ℓ1	ℓs	Po. Size	Coolant	Head
TISU1024F1250-3	1.024	1.059	1.250	1.772	3.071	5.315	2.362	26	Y	SMP26*
TISU1063F1250-3	1.063	1.098	1.250	1.772	3.189	5.453	2.362	27	Y	SMP27*
TISU1102F1250-3	1.102	1.138	1.250	1.772	3.307	5.606	2.362	28	Y	SMP28*
TISU1142F1250-3	1.142	1.177	1.250	1.772	3.425	5.744	2.362	29	Y	SMP29*
TISU1181F1250-3	1.181	1.217	1.250	1.772	3.543	5.893	2.362	30	Y	SMP30*
TISU1220F1250-3	1.220	1.256	1.250	1.772	3.661	6.031	2.362	31	Y	SMP31*
TISU1260F1500-3	1.260	1.295	1.500	2.165	3.780	6.378	2.677	32	Y	SMP32*
TISU1299F1500-3	1.299	1.335	1.500	2.165	3.898	6.516	2.677	33	Y	SMP33*
TISU1339F1500-3	1.339	1.374	1.500	2.165	4.016	6.654	2.677	34	Y	SMP34*
TISU1378F1500-3	1.378	1.413	1.500	2.165	4.134	6.807	2.677	35	Y	SMP35*
TISU1417F1500-3	1.417	1.453	1.500	2.165	4.252	6.945	2.677	36	Y	SMP36*
TISU1457F1500-3	1.457	1.492	1.500	2.165	4.370	7.083	2.677	37	Y	SMP37*
TISU1496F1500-3	1.496	1.531	1.500	2.165	4.488	7.240	2.677	38	Y	SMP38*
TISU1535F1500-3	1.535	1.571	1.500	2.165	4.606	7.378	2.677	39	Y	SMP39*
TISU1575F1500-3	1.575	1.614	1.500	2.165	4.724	7.516	2.677	40	Y	SMP40*

SPARE PARTS





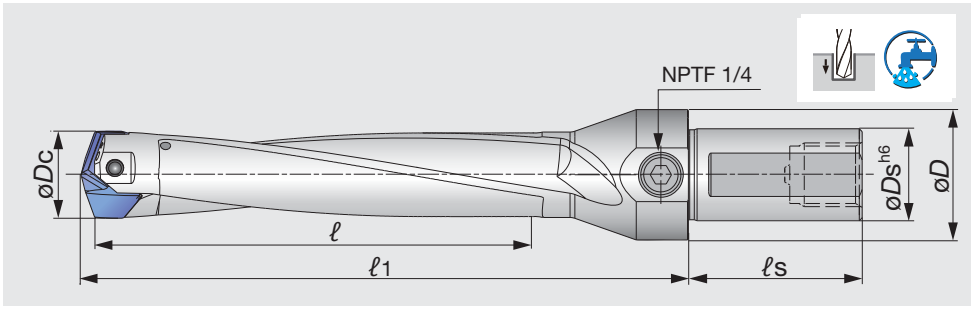
Designation	Clamping screw	Wrench		Screw for side port	Plug*
		Torx Bit	Grip		
TISU1024F1250-3	TS50230D3	BLDT20/S7	H-TB2W	NPTF1/4	SL32IN
TISU1063F1250-3	TS50230D3	BLDT20/S7	H-TB2W	NPTF1/4	SL32IN
TISU1102F1250-3	TS50250D35	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1142F1250-3	TS50250D35	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1181F1250-3	TS60265D4	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1220F1250-3	TS60265D4	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1260F1500-3	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1299F1500-3	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1339F1500-3	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1378F1500-3	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1417F1500-3	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1457F1500-3	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1496F1500-3	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1535F1500-3	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1575F1500-3	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN

øDc	Hole diameter tolerance
ø1.024 - ø1.142	+0.0020 / 0
ø1.181 - ø1.575	+0.0024 / 0

Head indexable large drill

DRILL - L/D = 5

DrillForceMeister TIS L/D = 5



Designation	øDc min	øDc max	øDs	øD	ℓ	ℓ1	ℓs	Po. Size	Coolant	Head
TISU1024F1250-5	1.024	1.059	1.250	1.772	5.118	7.362	2.362	26	Y	SMP26*
TISU1063F1250-5	1.063	1.098	1.250	1.772	5.315	7.579	2.362	27	Y	SMP27*
TISU1102F1250-5	1.102	1.138	1.250	1.772	5.512	7.811	2.362	28	Y	SMP28*
TISU1142F1250-5	1.142	1.177	1.250	1.772	5.709	8.028	2.362	29	Y	SMP29*
TISU1181F1250-5	1.181	1.217	1.250	1.772	5.906	8.256	2.362	30	Y	SMP30*
TISU1220F1250-5	1.220	1.256	1.250	1.772	6.102	8.472	2.362	31	Y	SMP31*
TISU1260F1500-5	1.260	1.295	1.500	2.165	6.299	8.898	2.677	32	Y	SMP32*
TISU1299F1500-5	1.299	1.335	1.500	2.165	6.496	9.114	2.677	33	Y	SMP33*
TISU1339F1500-5	1.339	1.374	1.500	2.165	6.693	9.331	2.677	34	Y	SMP34*
TISU1378F1500-5	1.378	1.413	1.500	2.165	6.890	9.563	2.677	35	Y	SMP35*
TISU1417F1500-5	1.417	1.453	1.500	2.165	7.087	9.780	2.677	36	Y	SMP36*
TISU1457F1500-5	1.457	1.492	1.500	2.165	7.283	9.996	2.677	37	Y	SMP37*
TISU1496F1500-5	1.496	1.531	1.500	2.165	7.480	10.232	2.677	38	Y	SMP38*
TISU1535F1500-5	1.535	1.571	1.500	2.165	7.677	10.449	2.677	39	Y	SMP39*
TISU1575F1500-5	1.575	1.614	1.500	2.165	7.874	10.665	2.677	40	Y	SMP40*

SPARE PARTS





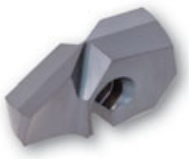
Disignation	Clamping screw	Wrench		Screw for side port	Plug*
		Torx Bit	Grip		
TISU1024F1250-5	TS50230D3	BLDT20/S7	H-TB2W	NPTF1/4	SL32IN
TISU1063F1250-5	TS50230D3	BLDT20/S7	H-TB2W	NPTF1/4	SL32IN
TISU1102F1250-5	TS50250D35	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1142F1250-5	TS50250D35	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1181F1250-5	TS60265D4	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1220F1250-5	TS60265D4	BLDT25/S7	H-TB2W	NPTF1/4	SL32IN
TISU1260F1500-5	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1299F1500-5	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1339F1500-5	TS60285D42	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1378F1500-5	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1417F1500-5	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1457F1500-5	TS60320D5	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1496F1500-5	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1535F1500-5	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN
TISU1575F1500-5	TS80340D6	BLDT25/S7	H-TB2W	NPTF1/4	SL38IN

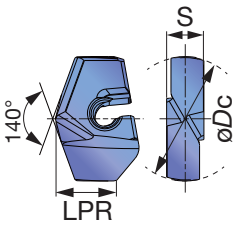
øDc	Hole diameter tolerance
ø1.024 - ø1.142	+0.0020 / 0
ø1.181 - ø1.575	+0.0024 / 0

*Optional part
Inner thread size: NPTF1/4

DRILL HEAD

SMP





Tool diameter	ø1.024 - ø1.142	ø1.181 - ø1.575
Head diameter tolerance	-0.0002" / -0.0010"	-0.0002" / -0.0012"

Designation	øDc	Grade AH725	S	LPR	Pocket size	Applicable body
SMP260	1.024	●	0.295	0.457	26	TISU1024F1250-*
SMP261	1.028	●	0.295	0.457	26	TISU1024F1250-*
SMP265	1.043	●	0.295	0.457	26	TISU1024F1250-*
SMP267	1.051	●	0.295	0.457	26	TISU1024F1250-*
SMP270	1.063	●	0.295	0.437	27	TISU1063F1250-*
SMP271	1.067	●	0.295	0.437	27	TISU1063F1250-*
SMP272	1.071	●	0.295	0.437	27	TISU1063F1250-*
SMP275	1.083	●	0.295	0.437	27	TISU1063F1250-*
SMP280	1.102	●	0.315	0.461	28	TISU1102F1250-*
SMP281	1.106	●	0.315	0.461	28	TISU1102F1250-*
SMP285	1.122	●	0.315	0.461	28	TISU1102F1250-*
SMP286	1.126	●	0.315	0.461	28	TISU1102F1250-*
SMP290	1.142	●	0.315	0.445	29	TISU1142F1250-*
SMP291	1.146	●	0.315	0.445	29	TISU1142F1250-*
SMP295	1.161	●	0.315	0.445	29	TISU1142F1250-*
SMP296	1.165	●	0.315	0.445	29	TISU1142F1250-*
SMP300	1.181	●	0.335	0.555	30	TISU1181F1250-*
SMP301	1.185	●	0.335	0.555	30	TISU1181F1250-*
SMP302	1.189	●	0.335	0.555	30	TISU1181F1250-*
SMP303	1.193	●	0.335	0.555	30	TISU1181F1250-*
SMP305	1.201	●	0.335	0.555	30	TISU1181F1250-*
SMP308	1.213	●	0.335	0.555	30	TISU1181F1250-*
SMP310	1.220	●	0.335	0.539	31	TISU1220F1250-*
SMP311	1.224	●	0.335	0.539	31	TISU1220F1250-*
SMP315	1.240	●	0.335	0.539	31	TISU1220F1250-*
SMP318	1.252	●	0.335	0.539	31	TISU1220F1250-*
SMP320	1.260	●	0.354	0.571	32	TISU1260F1250-*
SMP321	1.264	●	0.354	0.571	32	TISU1260F1250-*
SMP325	1.280	●	0.354	0.571	32	TISU1260F1250-*
SMP328	1.291	●	0.354	0.571	32	TISU1260F1250-*
SMP330	1.299	●	0.354	0.555	33	TISU1299F1250-*
SMP331	1.303	●	0.354	0.555	33	TISU1299F1250-*
SMP333	1.311	●	0.354	0.555	33	TISU1299F1250-*
SMP335	1.319	●	0.354	0.555	33	TISU1299F1250-*
SMP340	1.339	●	0.354	0.539	34	TISU1339F1250-*
SMP341	1.343	●	0.354	0.539	34	TISU1339F1250-*
SMP345	1.358	●	0.354	0.539	34	TISU1339F1250-*
SMP349	1.374	●	0.354	0.539	34	TISU1339F1250-*
SMP350	1.378	●	0.394	0.654	35	TISU1378F1250-*
SMP351	1.382	●	0.394	0.654	35	TISU1378F1250-*
SMP355	1.398	●	0.394	0.654	35	TISU1378F1250-*

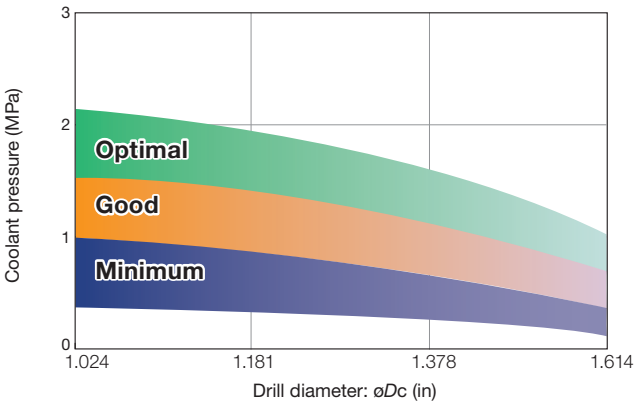
Designation	øDc	Grade AH725	S	LPR	Pocket size	Applicable body
SMP360	1.417	●	0.394	0.394	36	TISU1417F1250-*
SMP361	1.421	●	0.394	0.394	36	TISU1417F1250-*
SMP365	1.437	●	0.394	0.394	36	TISU1417F1250-*
SMP366	1.441	●	0.394	0.394	36	TISU1417F1250-*
SMP370	1.457	●	0.394	0.394	37	TISU1457F1250-*
SMP371	1.461	●	0.394	0.394	37	TISU1457F1250-*
SMP375	1.476	●	0.394	0.394	37	TISU1457F1250-*
SMP380	1.496	●	0.413	0.413	38	TISU1496F1250-*
SMP381	1.500	●	0.413	0.413	38	TISU1496F1250-*
SMP385	1.516	●	0.413	0.413	38	TISU1496F1250-*
SMP388	1.528	●	0.413	0.413	38	TISU1496F1250-*
SMP390	1.535	●	0.413	0.413	39	TISU1535F1250-*
SMP391	1.539	●	0.413	0.413	39	TISU1535F1250-*
SMP395	1.555	●	0.413	0.413	39	TISU1535F1250-*
SMP397	1.563	●	0.413	0.413	39	TISU1535F1250-*
SMP398	1.567	●	0.413	0.413	39	TISU1535F1250-*
SMP400	1.575	●	0.413	0.413	40	TISU1575F1250-*
SMP401	1.579	●	0.413	0.413	40	TISU1575F1250-*
SMP405	1.594	●	0.413	0.413	40	TISU1575F1250-*
SMP410	1.614	●	0.413	0.413	40	TISU1575F1250-*

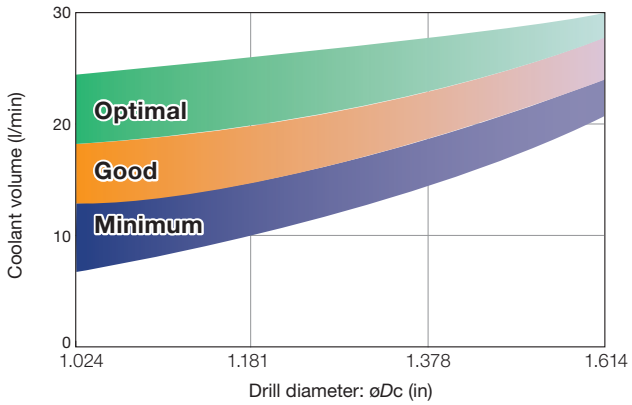
Package quantity = 1 pc
●: Line-up

STANDARD CUTTING CONDITIONS

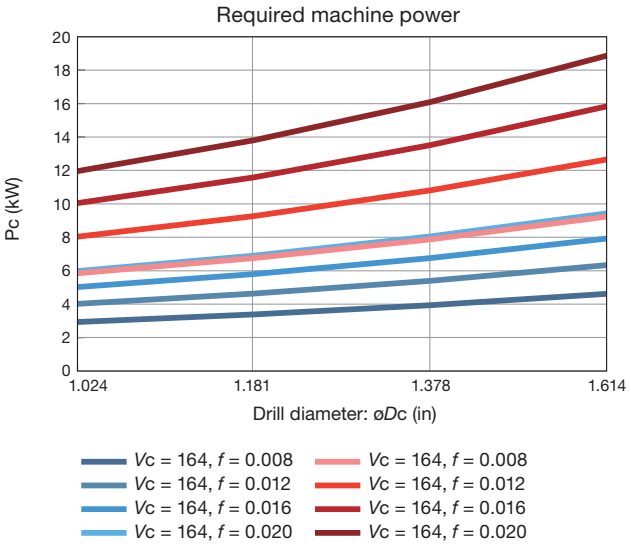
ISO	Workpiece materials	Cutting speed *Vc* (ipm)	Feed: *f* (ipr)		
			øDc (in)		
			1.024" - 1.177"	1.181" - 1.403"	1.417" - 1.614"
P	Low carbon steels 1015, etc.	262 - 459	0.008 - 0.02	0.008 - 0.02	0.01 - 0.022
P	Carbon steels, Alloy steels 1055, 44140, etc.	262 - 427	0.008 - 0.02	0.008 - 0.02	0. 01 - 0.022
P	Prehardened steels NAK80, PX5, etc.	164 - 328	0.008 - 0.02	0.008 - 0.02	0.01 - 0.022
M	Stainless steels S30400, etc	131 - 262	0.006 - 0.012	0.006 - 0.012	0.008 - 0.014
K	Gray cast irons No.250B, No.300B, etc.	262 - 591	0.01 - 0.022	0.01 - 0.022	0.012 - 0.024
K	Ductile cast irons 60-40-18, 80-55-06, etc.	262 - 459	0.01 - 0.022	0.01 - 0.022	0.012 - 0.024
N	Non ferrous materials	328 - 722	0.016 - 0.024	0.016 - 0.024	0.02 - 0.028
S	Heat-resistant alloys (Inconel718, etc.)	66 - 164	0.004 - 0.008	0.004 - 0.008	0.004 - 0.01
S	Titanium alloys (Ti-6Al-4V, etc.)	98 - 197	0.004 - 0.008	0.004 - 0.008	0.004 - 0.01
H	Hardened materials	66 - 197	0.004 - 0.008	0.004 - 0.008	0.004 - 0.01

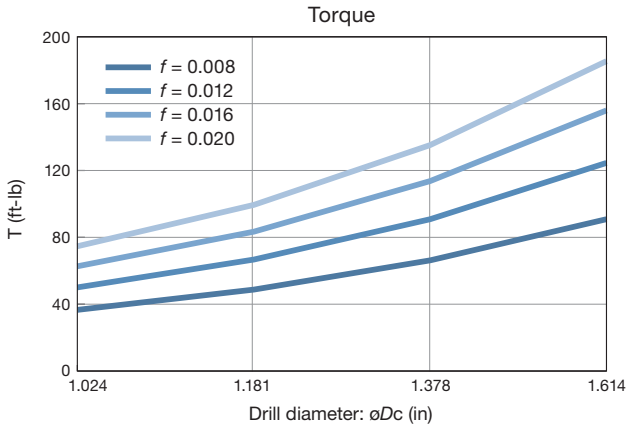
RECOMMENDED COOLANT PRESSURE AND VOLUME





REQUIRED MACHINE POWER AND TORQUE

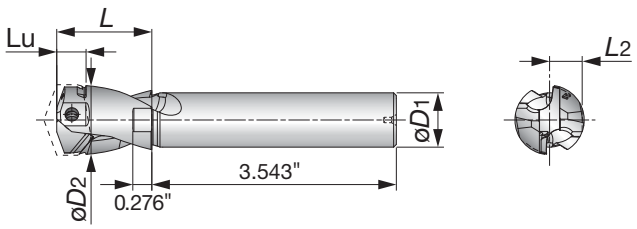




- **Please access to "Tungaloy machining power" to calculate more detailed cutting forces.**

http://mpwr.imc-companies.com/machiningpwr/machiningpower.wgx?vwginstance=3d4bfb46110a456b8d375e68942cd0a3&Home=tungaloy

REGRINDING HOLDER



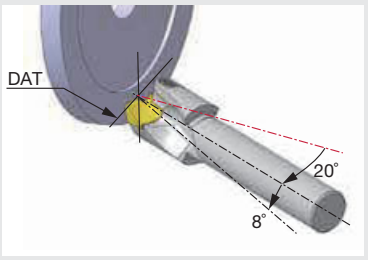
Designation	øD1	øD2	L	Lu	L2	Head
SMP260-279-GH	0.787	1.004	1.378	0.425	0.472	SMP260-SMP279
SMP280-299-GH	0.787	1.083	1.378	0.425	0.512	SMP280-SMP299
SMP300-319-GH	0.787	1.161	1.378	0.512	0.551	SMP300-SMP319
SMP320-349-GH	0.787	1.240	1.378	0.512	0.591	SMP320-SMP349
SMP350-379-GH	0.787	1.358	1.575	0.579	0.650	SMP350-SMP379
SMP380-410-GH	0.787	1.476	1.575	0.594	0.709	SMP380-SMP410

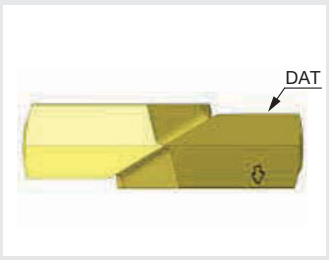
① Clamping

- Assemble the drill head on the regrinding holder or shortest standard holder (3xD)
- Set-up the drill head in the machine : Total run-out must be less than 0.0008"

② Grinding the 1st clearance angle

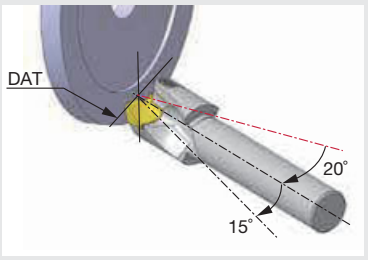
- Set the drill for point angle (140°) and 1st clearance angle (8°)
- Keep the cutting edge in the horizontal plane

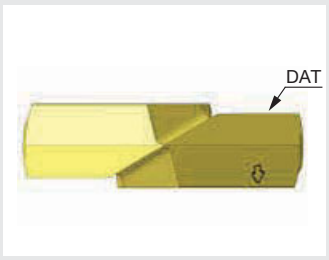




③ Grinding the 2nd clearance angle

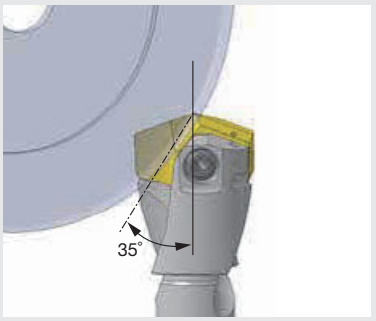
- Set the drill for 2nd clearance angle (15°)

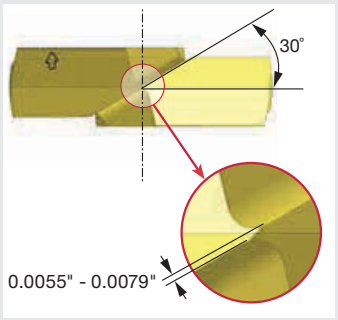




④ Grinding the chisel (Thinning)

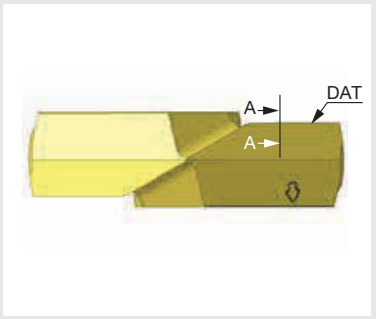
- Set the drill for thinning angle (35°) with reference to drill axis and angle (30°) with reference to radial axis
- Keep the chisel thickness (0.0055" - 0.0079") and the thinning point must be over the center line

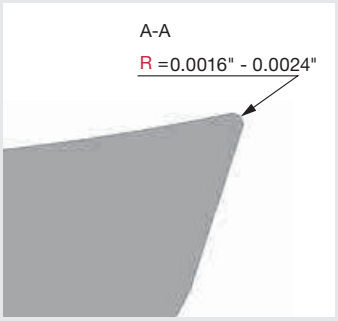




⑤ Edge preparation (Honing)

- Cutting edges should have honing by sand or brush (0.0016" - 0.0024")
- Nega-land by diamond hand lapper is also available
- The width of honing must be uniform with good surface finish

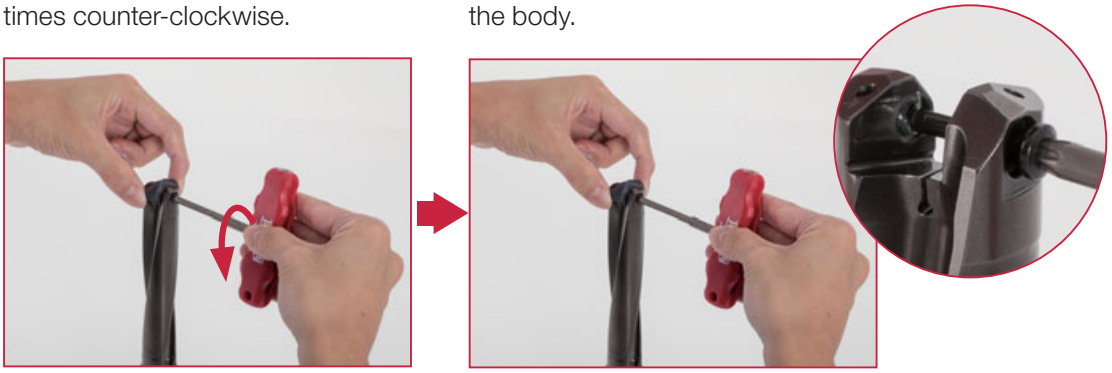




HOW TO CHANGE DRILL HEAD

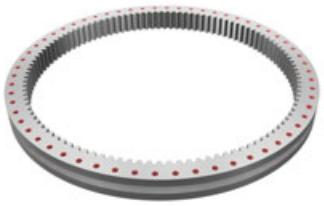
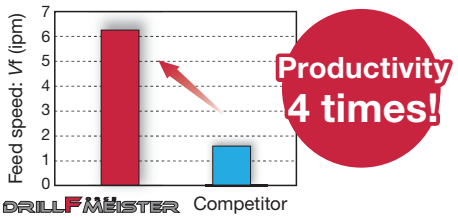
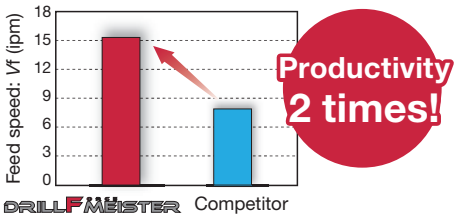
To unclamp rotate the screw 3-5 times counter-clockwise.

No need to remove the screw from the body.



- Please change the screw to new one when the screw does not rotate smoothly

PRACTICAL EXAMPLES

Workpiece type		Gate valve	Slewing ring
Drill		TISU1181F1250-5	TISU1299F1500-5
Head		SMP300	SMP331
Grade		AH725	AH725
Workpiece material		S30400	4140
		 M	 P
Cutting conditions	Cutting speed: *Vc* (sfm)	197	328
	Feed : *f* (ipr)	0.010	0.016
	Feed speed : *Vf* (in)	6.3	15
	Drilling depth : *H* (in)	4.73	5.9
	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.

MEMO

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