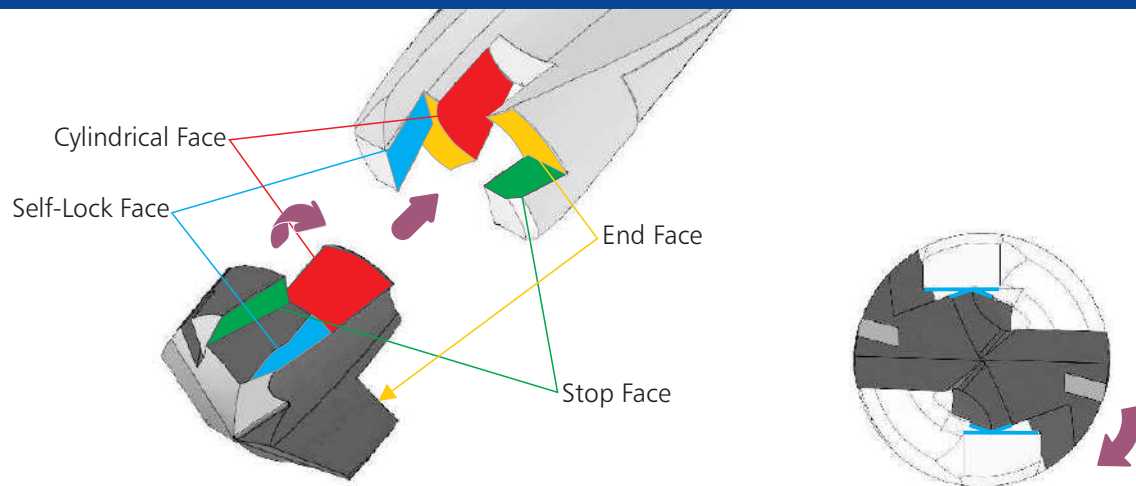




Self - Locked Indexable Carbide Head Drills

Innovation Self-Locked Clamping System



Centering By Cylindrical Faces

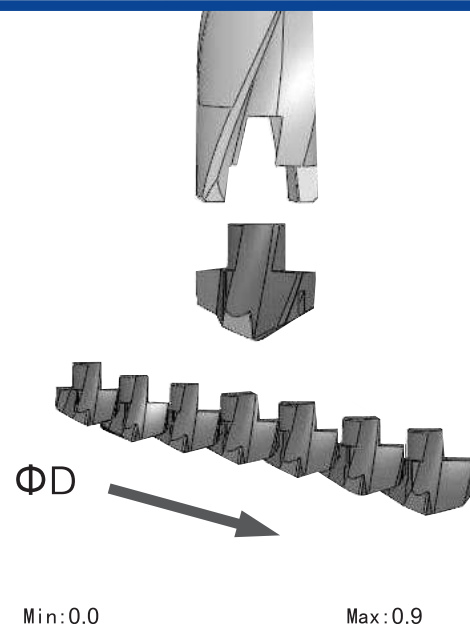
The Solid Head Can Be Self-Locked With Tool Holder While Inserted Due To Its Seat Elastic Deformation

Axial Drill Force is Transferred to Tool Holder By End Faces

Drill Torque is Transferred to Tool Holder By Stop Faces

Interchangeability and Flexibility

Different Solid Diameter Heads Can Be Fixed in to One Tool Holder so as to Reduce the Number of Tool Holder, and Solid Heads and Tool Holders are interchangeable Totally



How To Attach Solid Heads



1
Fix Drill Holder on Arbor
For Solid Head
Exchange, Fix Arbor on the
Machine or
Set on Tool Presetter



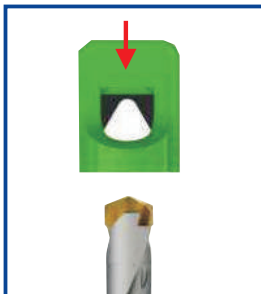
2
Remove Dust Using Air
Blast



3
Put a Solid Head into
Drill Holder. (Use Gloves to
Protect your Hand From
any Danger)



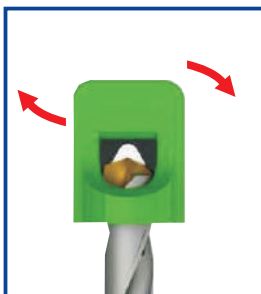
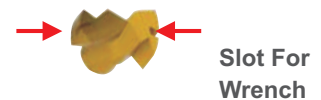
4
Turn Lightly in a
Clockwise Direction (Use
Gloves to Protect Your
Hand From Any Danger)



5
Set the Wrench Properly



6
Make Sure the Wrench Fits
With Solid Head's Slot
for the Wrench



7
Turn the Wrench in a
Clockwise Direction Slowly,
then Turn Strongly While
Passing Self-Locked Face
Until Solid head Won't
Move

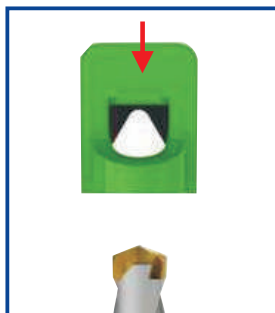


8
Complete

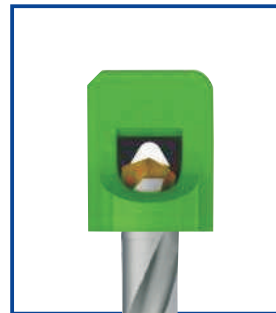
How To Detach Solid Heads



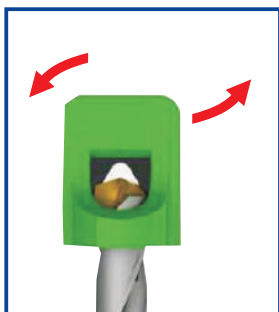
1
Remove Dust From Solid Head
Using Air Blast



2
Set the Wrench Properly



3
Fit the Wrench to Solid Head
Slot



4
Turn the Wrench in a Counter-
Clockwise Direction

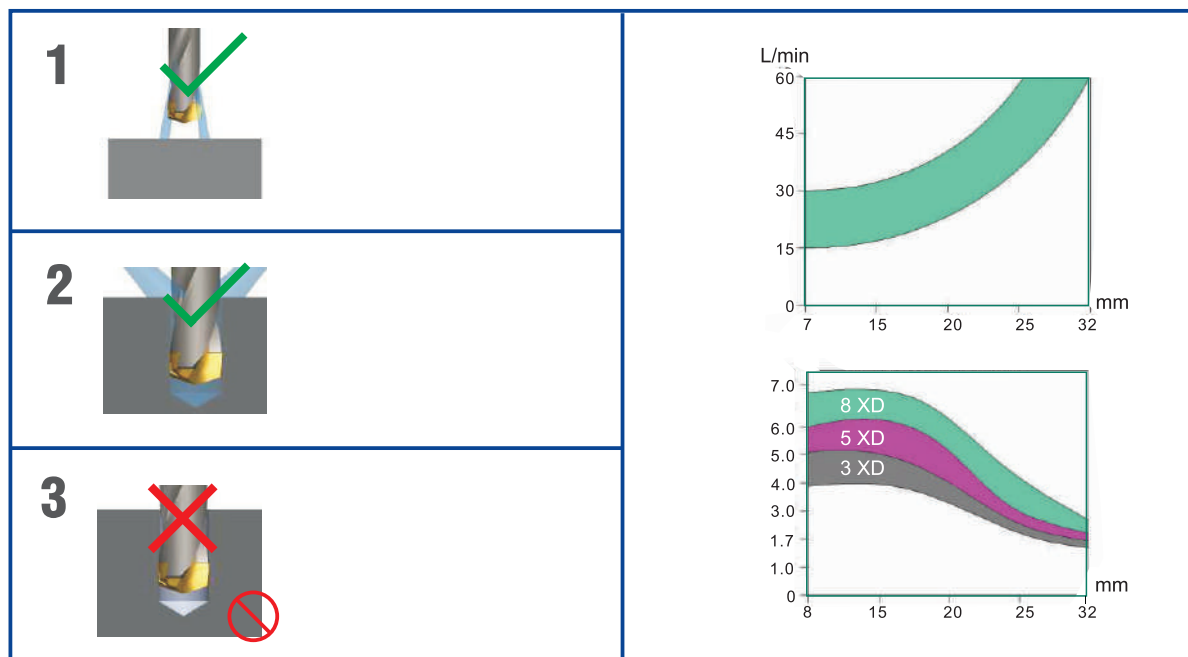


5
Once Self-Lock is
Released, Solid Head
Can be Turned by Fingers
(Use Gloves to Protect
Your Hand From Any
Danger)

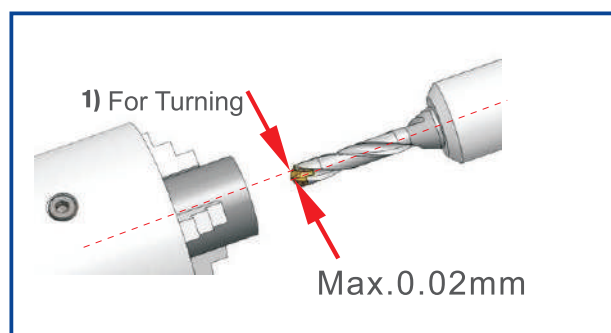


6
Remove Solid Head (Use
Gloves to Protect Your Hand
From any Danger)

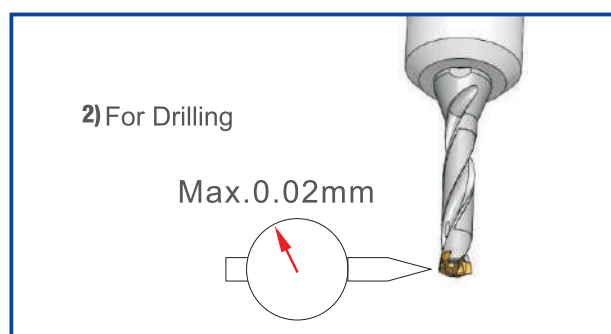
Recommended Coolant Flow



Usage Precautions Core Deviation



**Set Deviation Amount Under 0.02mm
Between the Workpiece and the Drill**

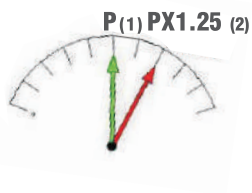


**Do Not Use Any Arbor With a Deformed
Attachment Surface.
Centre of Arbor Deviation Must Be Within
0.02 mm.**

Indication of Solid Head Wear



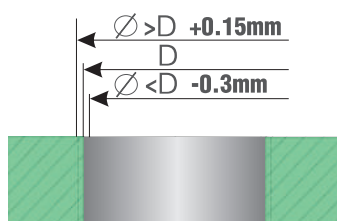
a) Wear Limit



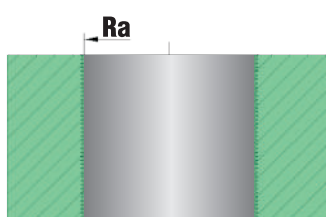
b) Power Restriction

(1) New Solid Head

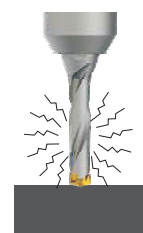
(2) Increase 25% For Wore-Out Solid Head



c) Diameter Change

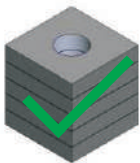


d) Surface Finish Deterioration

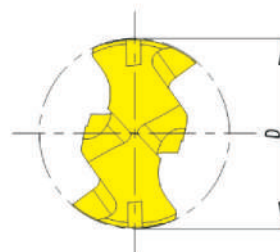
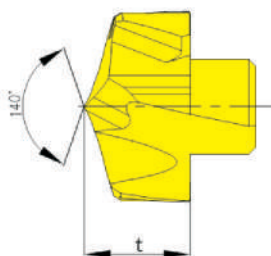


e) Vibration Noise Drastically Increases

Recommended Application

Application Recommendation	Workpiece Shape	Application Not Recommendation	Workpiece Shape
Flat Face Recommended		Hole Expansion Not Recommended	
Stacked Plates Recommended (absolutely don't move between plates)		Slanted Surface Not Recommended	
Concave Surface Recommended (reduce a half of feed rate as normal)		Half Cylindrical Not Recommended	
Pipe Material Recommended		Cored Hole Not Recommended	

TSH - AS DRILL SOLID HEAD

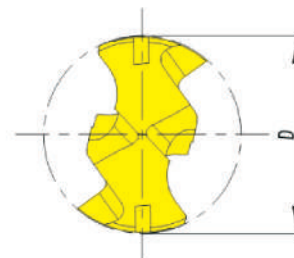
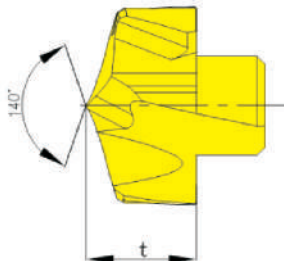


Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-080-AS	8.0	5.4	THD-080/089-12-D
TSH-081-AS	8.1	5.4	
TSH-082-AS	8.2	5.4	
TSH-083-AS	8.3	5.4	
TSH-084-AS	8.4	5.4	
TSH-085-AS	8.5	5.4	
TSH-086-AS	8.6	5.4	
TSH-087-AS	8.7	5.4	
TSH-088-AS	8.8	5.4	
TSH-089-AS	8.9	5.4	
TSH-090-AS	9.0	5.8	THD-090/099-12-D
TSH-091-AS	9.1	5.8	
TSH-092-AS	9.2	5.8	
TSH-093-AS	9.3	5.8	
TSH-094-AS	9.4	5.8	
TSH-095-AS	9.5	5.8	
TSH-096-AS	9.6	5.8	
TSH-097-AS	9.7	5.8	
TSH-098-AS	9.8	5.8	
TSH-099-AS	9.9	5.8	
TSH-100-AS	10.0	6.2	THD-100/109-16-D
TSH-101-AS	10.1	6.2	
TSH-102-AS	10.2	6.2	
TSH-103-AS	10.3	6.2	
TSH-104-AS	10.4	6.2	
TSH-105-AS	10.5	6.2	
TSH-106-AS	10.6	6.2	
TSH-107-AS	10.7	6.2	
TSH-108-AS	10.8	6.2	
TSH-109-AS	10.9	6.2	

Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-110-AS	11.0	6.6	THD-110/119-16-D
TSH-111-AS	11.1	6.6	
TSH-112-AS	11.2	6.6	
TSH-113-AS	11.3	6.6	
TSH-114-AS	11.4	6.6	
TSH-115-AS	11.5	6.6	
TSH-116-AS	11.6	6.6	
TSH-117-AS	11.7	6.6	
TSH-118-AS	11.8	6.6	
TSH-119-AS	11.9	6.6	
TSH-120-AS	12.0	7.0	THD-120/129-16-D
TSH-121-AS	12.1	7.0	
TSH-122-AS	12.2	7.0	
TSH-123-AS	12.3	7.0	
TSH-124-AS	12.4	7.0	
TSH-125-AS	12.5	7.0	
TSH-126-AS	12.6	7.0	
TSH-127-AS	12.7	7.0	
TSH-128-AS	12.8	7.0	
TSH-129-AS	12.9	7.0	
TSH-130-AS	13.0	7.6	THD-130/139-16-D
TSH-131-AS	13.1	7.6	
TSH-132-AS	13.2	7.6	
TSH-133-AS	13.3	7.6	
TSH-134-AS	13.4	7.6	
TSH-135-AS	13.5	7.6	
TSH-136-AS	13.6	7.6	
TSH-137-AS	13.7	7.6	
TSH-138-AS	13.8	7.6	
TSH-139-AS	13.9	7.6	

Recommend AS cutting head to be used for middle and high carbon steel, alloy steel, nodular cast iron (specially for less than 5D)

TSH - AS DRILL SOLID HEAD

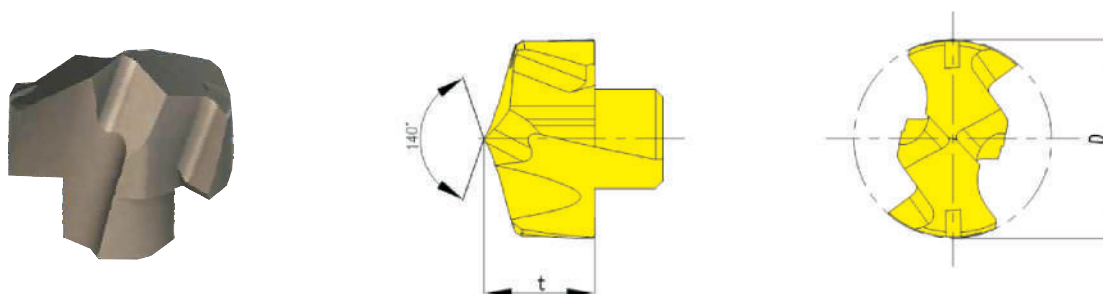


Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-140-AS	14.0	8.1	THD-140/149-16-D
TSH-141-AS	14.1	8.1	
TSH-142-AS	14.2	8.1	
TSH-143-AS	14.3	8.1	
TSH-144-AS	14.4	8.1	
TSH-145-AS	14.5	8.1	
TSH-146-AS	14.6	8.1	
TSH-147-AS	14.7	8.1	
TSH-148-AS	14.8	8.1	
TSH-149-AS	14.9	8.1	
TSH-150-AS	15.0	8.7	THD-150/159-20-D
TSH-151-AS	15.1	8.7	
TSH-152-AS	15.2	8.7	
TSH-153-AS	15.3	8.7	
TSH-154-AS	15.4	8.7	
TSH-155-AS	15.5	8.7	
TSH-156-AS	15.6	8.7	
TSH-157-AS	15.7	8.7	
TSH-158-AS	15.8	8.7	
TSH-159-AS	15.9	8.7	
TSH-160-AS	16.0	9.3	THD-160/169-20-D
TSH-161-AS	16.1	9.3	
TSH-162-AS	16.2	9.3	
TSH-163-AS	16.3	9.3	
TSH-164-AS	16.4	9.3	
TSH-165-AS	16.5	9.3	
TSH-166-AS	16.6	9.3	
TSH-167-AS	16.7	9.3	
TSH-168-AS	16.8	9.3	
TSH-169-AS	16.9	9.3	

Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-170-AS	17.0	9.9	THD-170/179-20-D
TSH-171-AS	17.1	9.9	
TSH-172-AS	17.2	9.9	
TSH-173-AS	17.3	9.9	
TSH-174-AS	17.4	9.9	
TSH-175-AS	17.5	9.9	
TSH-176-AS	17.6	9.9	
TSH-177-AS	17.7	9.9	
TSH-178-AS	17.8	9.9	
TSH-179-AS	17.9	9.9	
TSH-180-AS	18.0	10.5	THD-180/189-25-D
TSH-181-AS	18.1	10.5	
TSH-182-AS	18.2	10.5	
TSH-183-AS	18.3	10.5	
TSH-184-AS	18.4	10.5	
TSH-185-AS	18.5	10.5	
TSH-186-AS	18.6	10.5	
TSH-187-AS	18.7	10.5	
TSH-188-AS	18.8	10.5	
TSH-189-AS	18.9	10.5	
TSH-190-AS	19.0	11.0	THD-190/199-25-D
TSH-191-AS	19.1	11.0	
TSH-192-AS	19.2	11.0	
TSH-193-AS	19.3	11.0	
TSH-194-AS	19.4	11.0	
TSH-195-AS	19.5	11.0	
TSH-196-AS	19.6	11.0	
TSH-197-AS	19.7	11.0	
TSH-198-AS	19.8	11.0	
TSH-199-AS	19.9	11.0	

Recommend AS cutting head to be used for middle and high carbon steel, alloy steel, nodular cast iron (specially for less than 5D)

TSH - AS DRILL SOLID HEAD

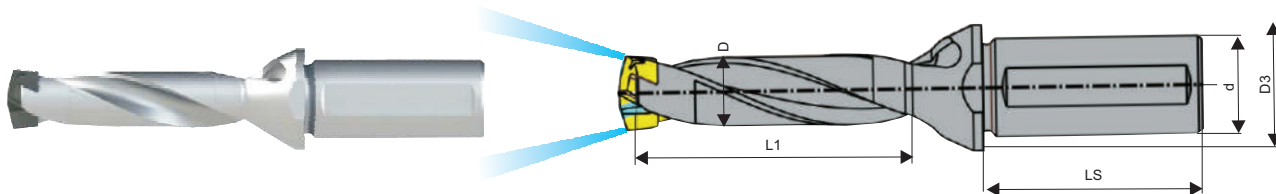


Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-140-AS	14.0	8.1	THD-140/149-16-D
TSH-141-AS	14.1	8.1	
TSH-142-AS	14.2	8.1	
TSH-143-AS	14.3	8.1	
TSH-144-AS	14.4	8.1	
TSH-145-AS	14.5	8.1	
TSH-146-AS	14.6	8.1	
TSH-147-AS	14.7	8.1	
TSH-148-AS	14.8	8.1	
TSH-149-AS	14.9	8.1	
TSH-150-AS	15.0	8.7	THD-150/159-20-D
TSH-151-AS	15.1	8.7	
TSH-152-AS	15.2	8.7	
TSH-153-AS	15.3	8.7	
TSH-154-AS	15.4	8.7	
TSH-155-AS	15.5	8.7	
TSH-156-AS	15.6	8.7	
TSH-157-AS	15.7	8.7	
TSH-158-AS	15.8	8.7	
TSH-159-AS	15.9	8.7	
TSH-160-AS	16.0	9.3	THD-160/169-20-D
TSH-161-AS	16.1	9.3	
TSH-162-AS	16.2	9.3	
TSH-163-AS	16.3	9.3	
TSH-164-AS	16.4	9.3	
TSH-165-AS	16.5	9.3	
TSH-166-AS	16.6	9.3	
TSH-167-AS	16.7	9.3	
TSH-168-AS	16.8	9.3	
TSH-169-AS	16.9	9.3	

Item Code	Dimensions (mm)		Body Code
	D ()	t	
TSH-230-AS	23.0	13.3	THD-230/239-32-D
TSH-231-AS	23.1	13.3	
TSH-232-AS	23.2	13.3	
TSH-233-AS	23.3	13.3	
TSH-234-AS	23.4	13.3	
TSH-235-AS	23.5	13.3	
TSH-236-AS	23.6	13.3	
TSH-237-AS	23.7	13.3	
TSH-238-AS	23.8	13.3	
TSH-239-AS	23.9	13.3	
TSH-240-AS	24.0	13.9	THD-240/249-32-D
TSH-241-AS	24.1	13.9	
TSH-242-AS	24.2	13.9	
TSH-243-AS	24.3	13.9	
TSH-244-AS	24.4	13.9	
TSH-245-AS	24.5	13.9	
TSH-246-AS	24.6	13.9	
TSH-247-AS	24.7	13.9	
TSH-248-AS	24.8	13.9	
TSH-249-AS	24.9	13.9	
TSH-250-AS	25.0	14.5	THD-250/260-32-D
TSH-251-AS	25.1	14.5	
TSH-252-AS	25.2	14.5	
TSH-253-AS	25.3	14.5	
TSH-254-AS	25.4	14.5	
TSH-255-AS	25.5	14.5	
TSH-256-AS	25.6	14.5	
TSH-257-AS	25.7	14.5	
TSH-258-AS	25.8	14.5	
TSH-259-AS	25.9	14.5	
TSH-260-AS	26.0	14.5	

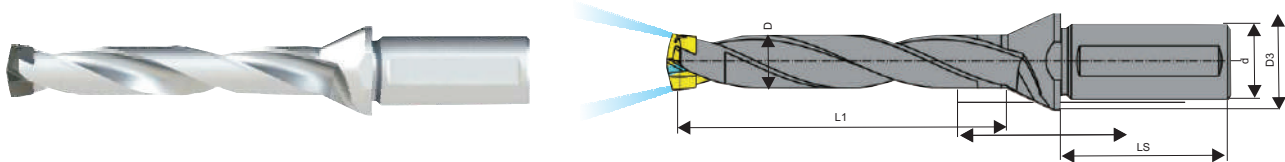
Recommend AS cutting head to be used for middle and high carbon steel, alloy steel, nodular cast iron (specially for less than 5D)

THD - 3D SOLID HEAD DRILL BODY WITHOUT COOLANT



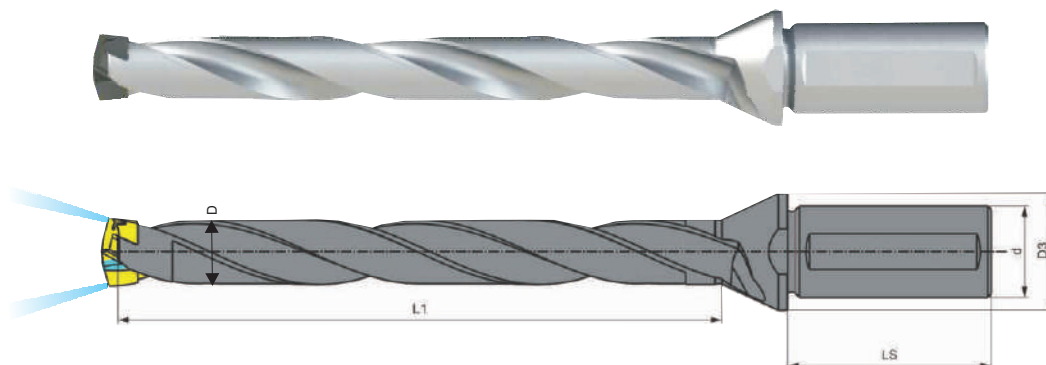
Item Code	Applicable Carbide Head Dia. (mm)	Dimensions (mm)					Wrench
		d	D3	L1	Ls	D	
THD-080/089-12-3D	8.0~8.9	12	16	32	45	7.8	THDW 8-11.9
THD-090/099-12-3D	9.0~9.9	12	16	35	45	8.8	
THD-100/109-16-3D	10.0~10.9	16	20	39	48	9.8	
THD-110/119-16-3D	11.0~11.9	16	20	42	48	10.8	
THD-120/129-16-3D	12.0~12.9	16	20	45	48	11.8	THDW 12-16.9
THD-130/139-16-3D	13.0~13.9	16	20	49	48	12.8	
THD-140/149-16-3D	14.0~14.9	16	20	53	48	13.8	
THD-150/159-20-3D	15.0~15.9	20	25	56	50	14.8	
THD-160/169-20-3D	16.0~16.9	20	25	60	50	15.8	THDW 17-20.9
THD-170/179-20-3D	17.0~17.9	20	25	63	50	16.8	
THD-180/189-25-3D	18.0~18.9	25	32	66	56	17.8	
THD-190/199-25-3D	19.0~19.9	25	32	70	56	18.8	
THD-200/209-25-3D	20.0~20.9	25	32	73	56	19.8	THDW 21-26
THD-210/219-25-3D	21.0~21.9	25	32	77	56	20.8	
THD-220/229-25-3D	22.0~22.9	25	32	80	56	21.8	
THD-230/239-32-3D	23.0~23.9	32	42	84	60	22.8	
THD-240/249-32-3D	24.0~24.9	32	42	88	60	23.8	
THD-250/260-32-3D	25.0~26.0	32	42	91	60	24.8	

THD - 5D SOLID HEAD DRILL BODY WITHOUT COOLANT



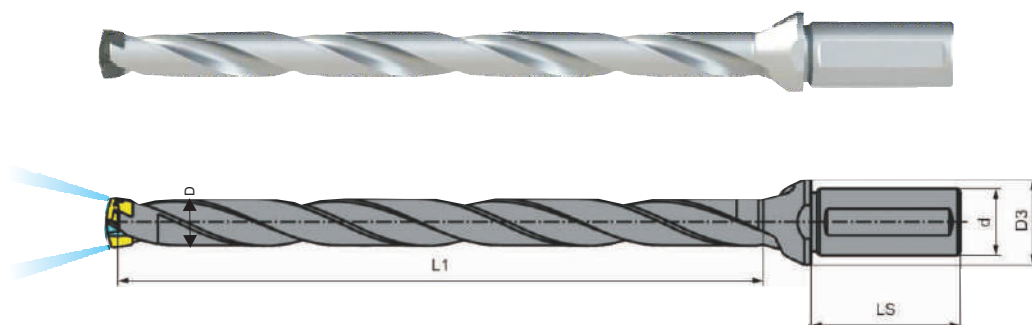
Item Code	Applicable Carbide Head Dia. (mm)	Dimensions (mm)					Wrench
		d	D3	L1	Ls	D	
THD-080/089-12-5D	8.0~8.9	12	16	50	45	7.8	THDW 8-11.9
THD-090/099-12-5D	9.0~9.9	12	16	55	45	8.8	
THD-100/109-16-5D	10.0~10.9	16	20	60	48	9.8	
THD-110/119-16-5D	11.0~11.9	16	20	66	48	10.8	
THD-120/129-16-5D	12.0~12.9	16	20	71	48	11.8	THDW 12-16.9
THD-130/139-16-5D	13.0~13.9	16	20	77	48	12.8	
THD-140/149-16-5D	14.0~14.9	16	20	82	48	13.8	
THD-150/159-20-5D	15.0~15.9	20	25	88	50	14.8	
THD-160/169-20-5D	16.0~16.9	20	25	93	50	15.8	THDW 17-20.9
THD-170/179-20-5D	17.0~17.9	20	25	99	50	16.8	
THD-180/189-25-5D	18.0~18.9	25	32	104	56	17.8	
THD-190/199-25-5D	19.0~19.9	25	32	110	56	18.8	
THD-200/209-25-5D	20.0~20.9	25	32	115	56	19.8	THDW 21-26
THD-210/219-25-5D	21.0~21.9	25	32	121	56	20.8	
THD-220/229-25-5D	22.0~22.9	25	32	126	56	21.8	
THD-230/239-32-5D	23.0~23.9	32	42	132	60	22.8	
THD-240/249-32-5D	24.0~24.9	32	42	137	60	23.8	THDW 21-26
THD-250/260-32-5D	25.0~26.0	32	42	143	60	24.8	

THD - 8D SOLID HEAD DRILL BODY WITHOUT COOLANT



Item Code	Applicable Carbide Head Dia. (mm)	Dimensions (mm)					Wrench
		d	D3	L1	Ls	D	
THD-080/089-12-8D	8.0~8.9	12	16	76	45	7.6	THDW 8-11.9
THD-090/099-12-8D	9.0~9.9	12	16	85	45	8.6	
THD-100/109-16-8D	10.0~10.9	16	20	93	48	9.6	
THD-110/119-16-8D	11.0~11.9	16	20	102	48	10.6	
THD-120/129-16-8D	12.0~12.9	16	20	110	48	11.6	THDW 12-16.9
THD-130/139-16-8D	13.0~13.9	16	20	119	48	12.6	
THD-140/149-16-8D	14.0~14.9	16	20	127	48	13.6	
THD-150/159-20-8D	15.0~15.9	20	25	136	50	14.6	
THD-160/169-20-8D	16.0~16.9	20	25	144	50	15.6	THDW 17-20.9
THD-170/179-20-8D	17.0~17.9	20	25	153	50	16.6	
THD-180/189-25-8D	18.0~18.9	25	32	161	56	17.6	
THD-190/199-25-8D	19.0~19.9	25	32	170	56	18.6	
THD-200/209-25-8D	20.0~20.9	25	32	178	56	19.6	THDW 21-26
THD-210/219-25-8D	21.0~21.9	25	32	187	56	20.6	
THD-220/229-25-8D	22.0~22.9	25	32	195	56	21.6	
THD-230/239-32-8D	23.0~23.9	32	42	204	60	22.6	
THD-240/249-32-8D	24.0~24.9	32	42	212	60	23.6	
THD-250/260-32-8D	25.0~26.0	32	42	221	60	24.6	

THD - 12D SOLID HEAD DRILL BODY WITHOUT COOLANT



Item Code	Applicable Carbide Head Dia. (mm)	Dimensions (mm)					Wrench
		d	D3	L1	Ls	D	
THD-120/129-16-12D	12.0~12.9	16	20	162	48	11.6	THDW 12-16.9
THD-130/139-16-12D	13.0~13.9	16	20	175	48	12.6	
THD-140/149-16-12D	14.0~14.9	16	20	187	48	13.6	
THD-150/159-20-12D	15.0~15.9	20	20	200	50	14.6	
THD-160/169-20-12D	16.0~16.9	20	20	212	50	15.6	
THD-170/179-20-12D	17.0~17.9	20	20	225	50	16.6	THDW 17-20.9
THD-180/189-25-12D	18.0~18.9	25	32	237	56	17.6	
THD-190/199-25-12D	19.0~19.9	25	32	250	56	18.6	
THD-200/209-25-12D	20.0~20.9	25	32	262	56	19.6	
THD-210/219-25-12D	21.0~21.9	25	32	275	56	20.6	
THD-220/229-25-12D	22.0~22.9	25	32	287	56	21.6	THDW 21-26
THD-230/239-32-12D	23.0~23.9	32	42	300	56	22.6	
THD-240/249-32-12D	24.0~24.9	32	42	313	56	23.6	
THD-250/260-32-12D	25.0~26.0	32	42	325	56	24.6	

Technical Information

ISO	materials	heat treatment	(N/mm ²) drawing force	(HB) hardness	Vc(m/min) cutting speed	Feed rate(mm/rev)					
						D<10	D=10~11.9	D=12~13.9	D=14~15.9	D=16~19.9	D=20~25.9
P	unalloy steel	<0.25% C annealed	420	125	80~140						
		>=0.25% C annealed	650	190	80~130	0.12	0.15	0.18	0.20	0.25	0.25
	cast iron	<0.55% C annealing and tempering	850	250	80~120	0.17	0.21	0.24	0.27	0.35	0.35
		>=0.55% C annealed	750	220	70~110	0.22	0.28	0.30	0.35	0.45	0.45
	free cutting steel	annealing and tempering	1000	300	50~90						
		annealed	600	200	70~120	0.12	0.14	0.16	0.18	0.23	0.25
	low carbon steel		930	275	70~110	0.18	0.21	0.24	0.26	0.31	0.35
		annealing and tempering	1000	300	50~90	0.25	0.28	0.32	0.35	0.40	0.45
	cast iron(alloy composition<5%)		1200	350	40~70						
		annealing and tempering	680	200	50~90	0.12	0.12	0.15	0.18	0.20	0.22
M	stainless steel cast iron	annealing and tempering	1100	325	40~80	0.16	0.17	0.20	0.23	0.25	0.27
		ferritic/martensite	680	200	40~70	0.20	0.22	0.25	0.28	0.30	0.33
		martensite	820	240	40~70	0.10	0.12	0.14	0.16	0.16	0.18
		austenitic	600	180	30~70	0.12	0.15	0.17	0.20	0.21	0.24
K	gray cast iron	ferritic		160	90~160						
		pearlitic		250	80~140	0.15	0.18	0.20	0.24	0.26	0.30
	nodular SG iron	ferritic		180	90~180	0.15	0.20	0.25	0.30	0.35	0.35
		pearlitic		260	80~140	0.22	0.27	0.32	0.37	0.45	0.37
N	malleable cast iron	ferritic		130	90~160	0.30	0.35	0.40	0.45	0.55	0.60
		pearlitic		230	80~140						
	cast aluminium alloy	unsolidification		60	90~220						
		solidification		100	90~220						
	cast aluminium alloy	<=12% Si unsolidification		75	90~220	0.20	0.25	0.30	0.35	0.40	0.45
		solidification		90	90~220	0.27	0.32	0.37	0.42	0.50	0.57
	copper alloy	>12% Si high temperature treatment		130	80~160	0.35	0.40	0.45	0.50	0.60	0.70
		>1% Pb free cutting		110	90~220						
S	high temperature alloys	copper		90	90~220						
		cathode copper		100	90~220						
		plastic fiber									
		hard rubber									
		annealed			30~60	0.06	0.08	0.10	0.12	0.12	0.14
	iron-base	solidification		200	20~50	0.08	0.10	0.12	0.15	0.16	0.18
		annealed		280	20~50	0.11	0.13	0.15	0.18	0.20	0.22
		solidification		250	20~50	0.06	0.08	0.10	0.12	0.14	0.16
		cobalt base Cast		350	20~50	0.09	0.11	0.14	0.16	0.18	0.20
	titanium,titanium alloys		Rm400	320	20~50	0.12	0.15	0.18	0.20	0.22	0.25
		α + β alloys	RM1050		20~50	0.06	0.08	0.10	0.12	0.14	0.16
H	hard steel	harden		55HRC	20~50	0.09	0.11	0.14	0.16	0.18	0.20
		harden		60HRC	20~50	0.12	0.15	0.18	0.20	0.22	0.25
	chilled cast iron	cast		400							
	cast iron	harden		55HRC							

* Lower cutting speed and feed rate should be used for tool holders of 8D or 12D



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