PRODUCT NEWS

PN-E-016

NEW PRODUCT

DIJET®

Spot facing drill

TLDD type

- Spot facing drill with point angle of 180°(flat face)
- Line up

Without coolant hole
TLDM type：φ1～φ14（2D）

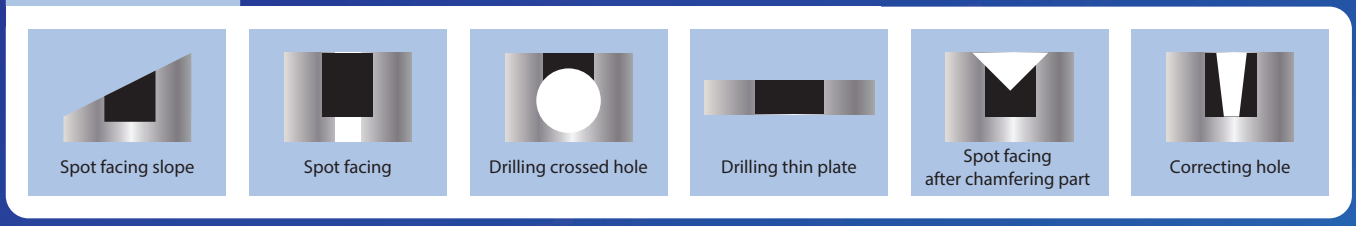
Through coolant hole
TLD3D type：φ3～φ14（3D）
TLD5D type：φ3～φ14（5D）

DIJET GmbH・www.dijet.de

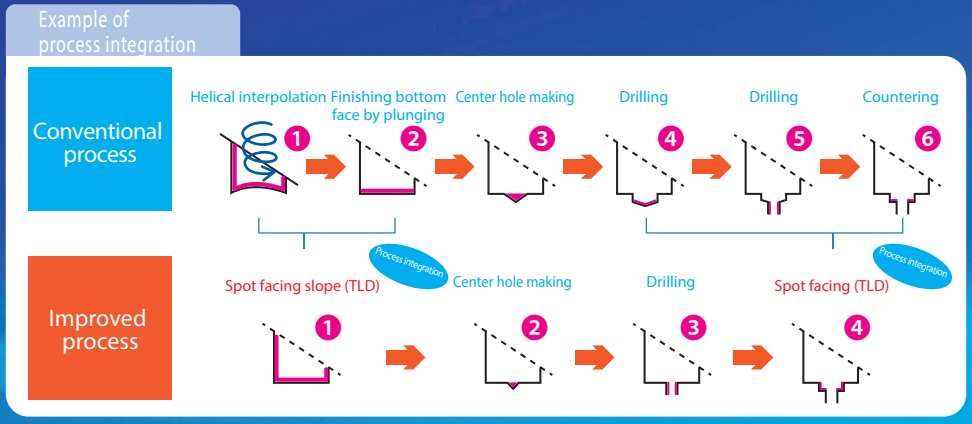
Feature of product

■ Because of multi application, achieved process integration

The main usage



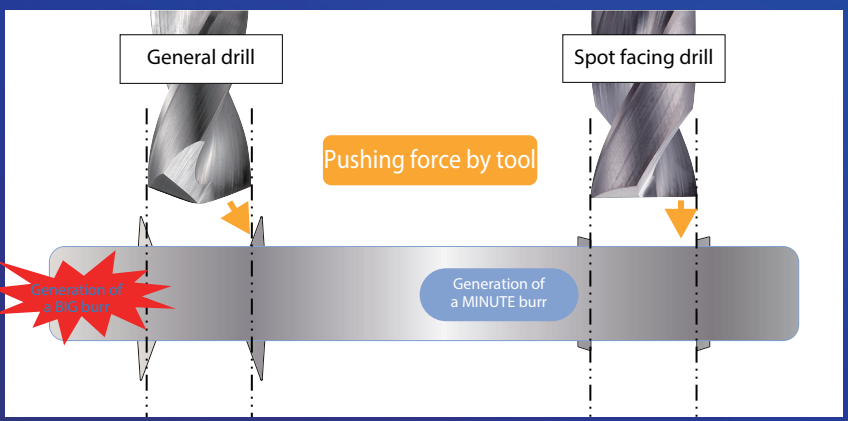
Example of process integration



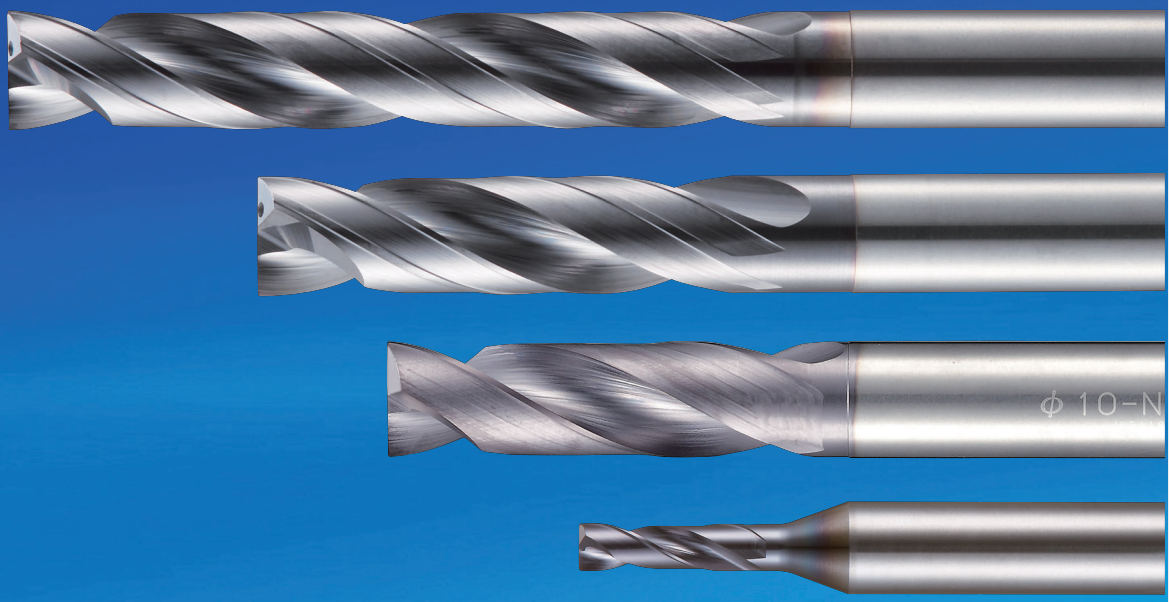
6 processes
→4 Processes

■ Widely applied from carbon & mold steel to stainless steel, cast iron & aluminum alloy

■ Restraing entrance burr and exit burr

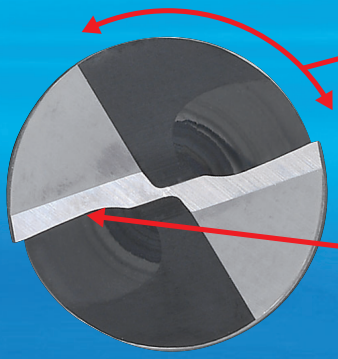


Useful in situations where burr processing is difficult, such as crossed hole processing



TLDM type (Drilling depth 2×Dc, Stock in Japan)

Because of shortness overhung length, improved accuracy
Specializing in thin plate and bottom face processing



Wide flute design

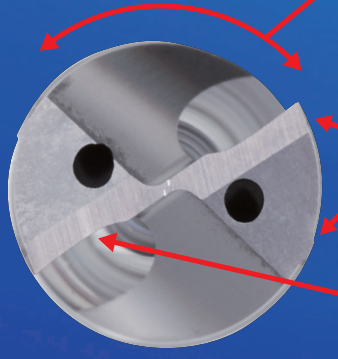
Good chip discharge performance

Low cutting force

Excellent biting property

TLD3D/5D type (Drilling depth 3×Dc/5×Dc(Stock in Japan))

Through coolant hole type
Specializing in deep hole drilling



Wide flute design and
Smooth surface treatment

Good chip discharge performance

Double margin shape

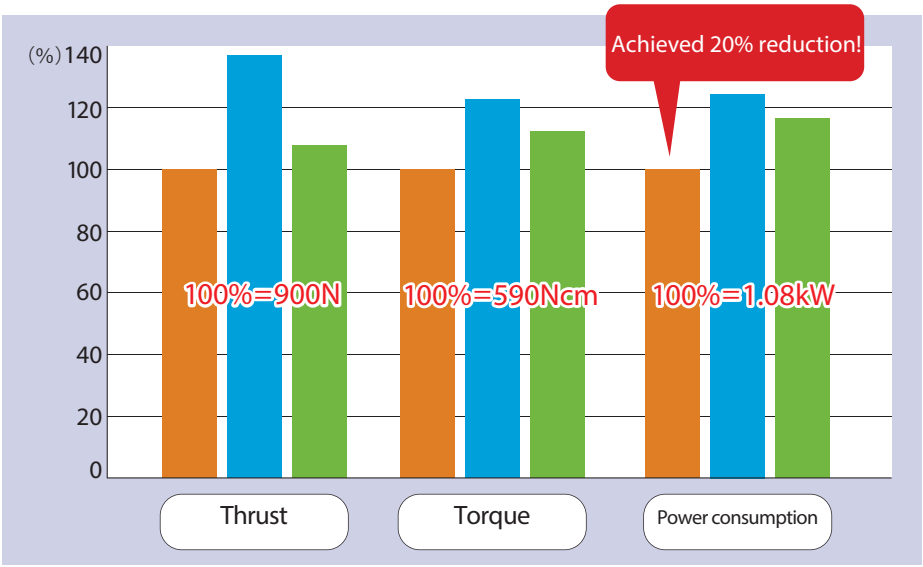
Improved straightness of the drilling

Low cutting force

Excellent biting property

Cutting performance

Cutting force comparison(φ 10)



DIJET
Competitor K
Competitor A

Material C50

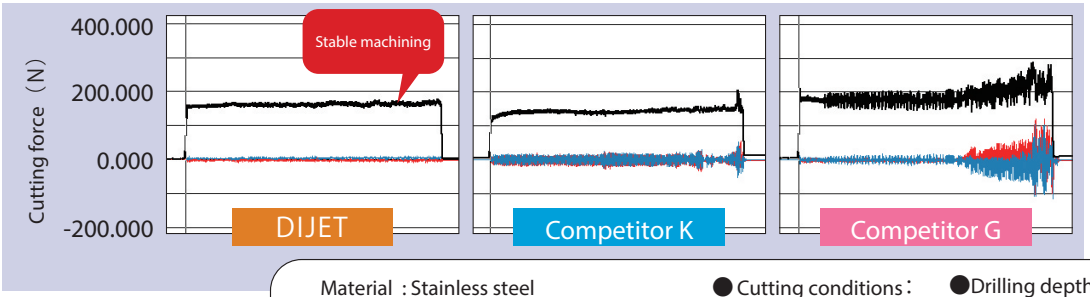
● : Tool dia. φ10 (TLDM100)

● : Cutting conditions
n=1,910min^{-1}, Vc=60m/min,
Vf=382mm/min, f=0.2mm/rev

● : Drilling depth
H=20mm (Blind)

● : Coolant External (water soluble)

Cutting force comparison (φ 3.5, <shank φ 6>)



Radial force in X-direction
Radial force in Y-direction
Thrust

Material : Stainless steel

Machine : Vertical MC

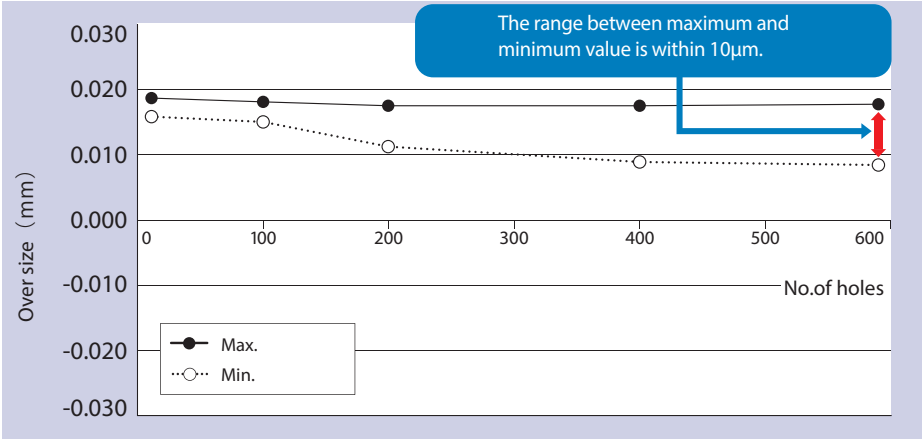
● Tool dia. : φ3.5

● Cutting conditions :
n=2,502min^{-1}
Vc=27.5m/min
Vf=50mm/min
f=0.02mm/rev

● Drilling depth : H=3.5mm (Blind)

● Coolant : External (water soluble)

Hole accuracy



Material :C50

Machine : Vertical MC

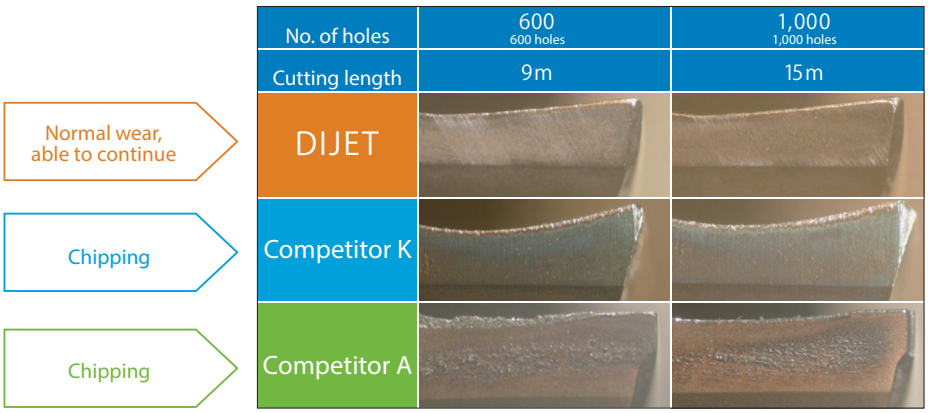
● Tool dia. : φ10 (TLDM100)

● Cutting conditions :
n=2,548min^{-1}, Vc=80m/min,
Vf=254mm/min, f=0.1mm/rev

● Drilling depth : H=15mm (Blind)

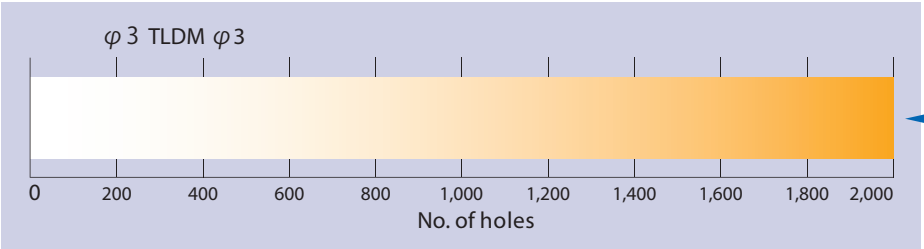
● Coolant : External (water soluble)

Tool life test (φ10) (carbon steel C50)



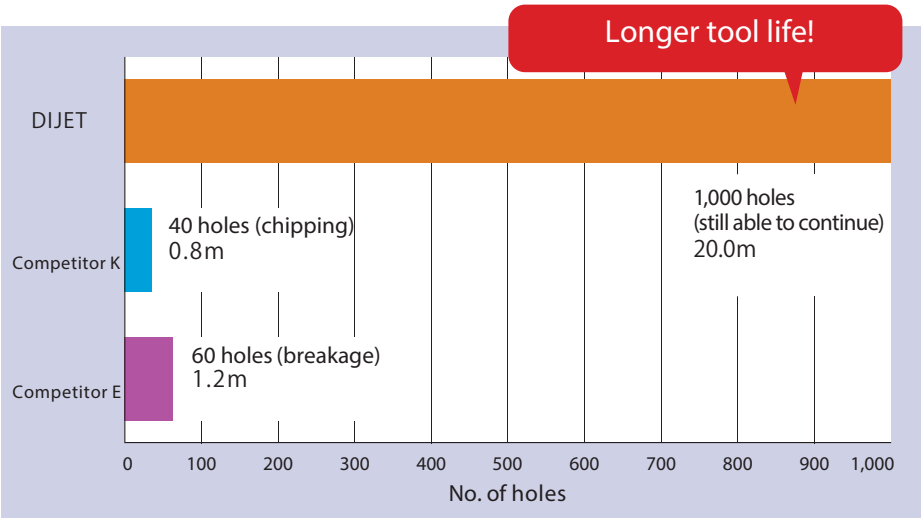
Material :C50
Machine : Vertical MC
● Tool dia. : φ10 (TLDM100)
● Cutting conditions :
n=2,548min^{-1}, Vc=80m/min, Vf=254mm/min, f=0.1mm/rev
● Drilling depth : H=15mm (Blind)
● Coolant : External (water soluble)

Tool life test (φ3) (mold steel P21)



Material :P21 (40HRC)
● Tool dia. : φ3 (TLDM030)
Machine : Vertical MC
● Cutting conditions : n=3,185min , Vc=30m/min, Vf=191mm/min, f=0.06mm/rev
● Drilling depth : H=6mm (Blind)
● Coolant : External (water soluble)

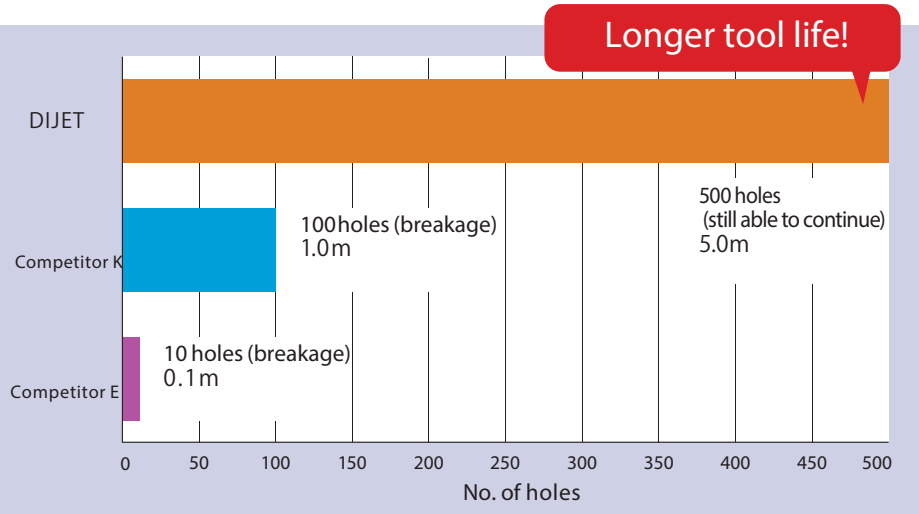
Tool life test (φ10) (mold steel P21)



Material P21
Machine : Vertical MC
● Tool dia. : φ10 (TLDM100)
● Cutting conditions :
n=955min , Vc=30m/min, Vf=96mm/min, f=0.1mm/rev
● Drilling depth : H=20mm (Blind)
● Coolant : External (water soluble)

Cutting performance

Tool life test (φ10) (stainless steel)



Material :Stainless steel

Machine : Vertical MC

● Tool dia. : φ10

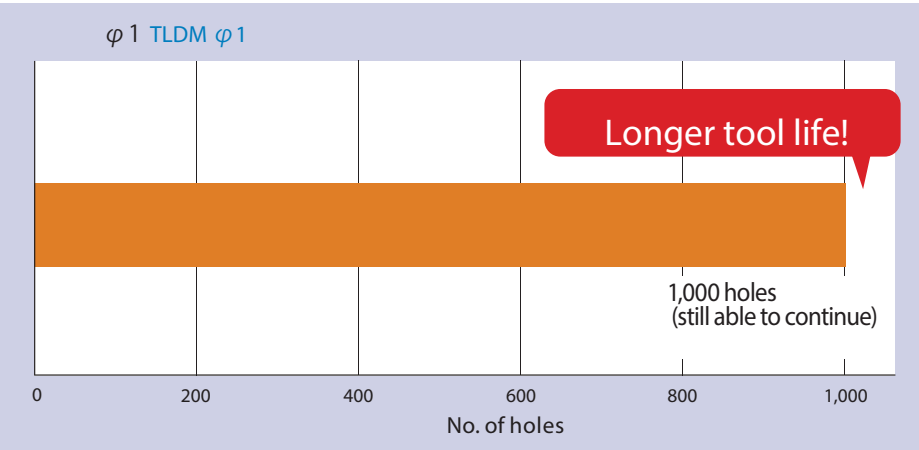
● Cutting conditions :

n=955min⁻¹, Vc=30m/min,
Vf=76mm/min, f=0.08mm/rev

● Drilling depth : H=10mm (Blind)

● Coolant : External (water soluble)

Tool life test (φ1) (stainless steel)



Material : Stainless steel

Machine : Vertical MC

● Tool dia. : φ1

● Cutting conditions :

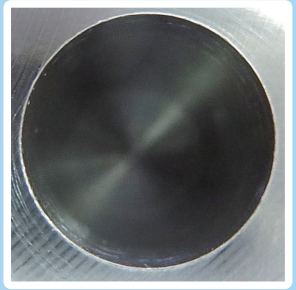
n=10,000min⁻¹, Vc=31.4m/min,
Vf=50mm/min, f=0.005mm/rev

● Drilling depth : H=1mm (Blind)

● Coolant : External (water soluble)

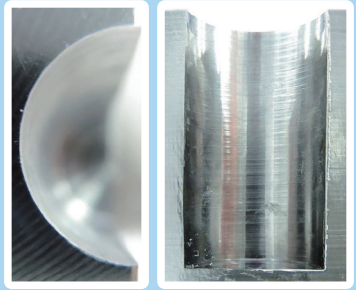
Cutting performance for Titanium alloy (φ10.7)

Hole accuracy



In case of using TLDM107 (ϕ10.7), the over size of hole diameter is within 10μm.

Half hole drilling



Achieved smooth machining even in case of drilling half hole !

Material :Titanium alloy

Machine : Vertical MC

● Tool dia. : φ10.7

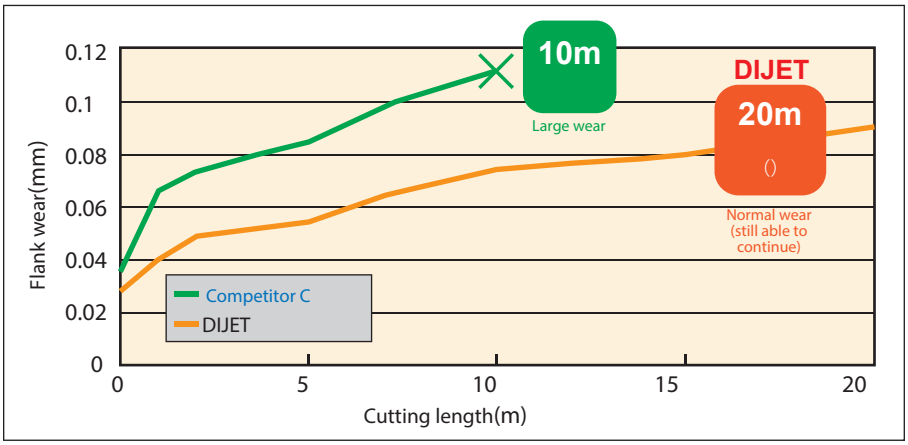
● Cutting conditions :
n=900min⁻¹, Vc=30.3m/min
Vf=90mm/min, f=0.10mm/rev

(Vf=30mm/min, f=0.033mm/rev
In case of drilling half hole)

● Drilling depth : H=20mm (Blind)

● Coolant : External (water soluble)

Tool life comparison (SUS303)



Material :Stainless steel

Machine : Vertical MC

● Tool dia. : φ14 (5D)(TLD5DCH1400S14)

● Cutting conditions:
n=682min ,Vc=30m/min,
Vf=102mm/min, f=0.15mm/rev

●Drilling depth : H=70mm (Blind)

Depth of guide hole drilling : 7mm

● : Coolant Internal (water soluble)

Initial biting & surface roughness comparison (SUS303)

Material :Sainless steel
Machine : Vertical MC
● Tool dia. : φ8 (5D)(TLD5DCH0800S08)

● Cutting conditions:
n=1,194min ,Vc=30m/min,
Vf=155mm/min, f=0.13mm/rev

●Overhung length : 60mm

●Drilling depth : H=30mm (Thru.)

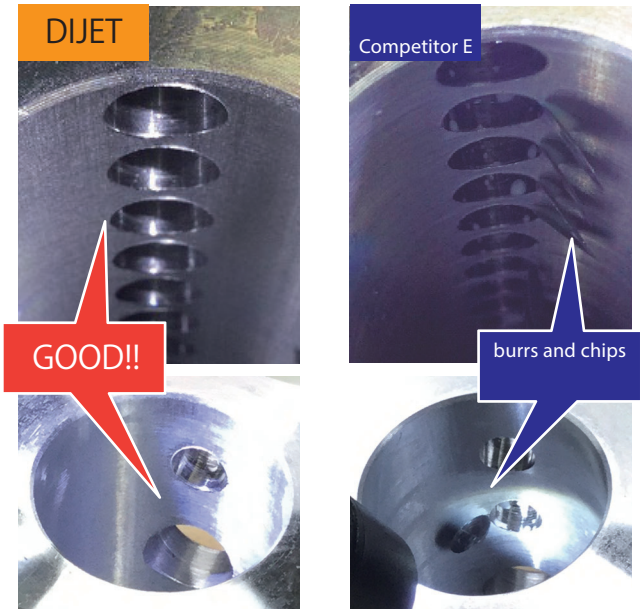
Guide hole making, 0.5mm step feed

● : Coolant Internal (water soluble)

Result

Compared with competitor K, TLD5D type provides better initial bite & small run-out, and showed good surface roughness.

Drilling crossed hole for Ni-Cr-Mo steel



Material :Ni-Cr-Mo steel
Machine : Vertical MC
● Tool dia. : φ8 (TLD5DCH0800S08)

● Cutting conditions:
n=1,194min^{-1},Vc=30m/min,Vf=179mm/min, f=0.15mm/rev

●Drilling depth : H=25mm (Thru.)

φ7.8 guide hole, 1mm step feed

●Overhung length : 55mm ● : Coolant Internal (water soluble)

●Gauge length : 115mm

Result

After drilling crossed hole (45 holes), TLD5D type controlled burr and chips when withdrawn, but flat drill of competitor E showed burr and chips.

Line up Line up

Spot facing drill TLDM type

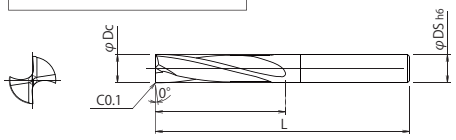
Spot facing drill with point angle of 180 °(flat face)
Drilling depth 2×Dc
Helix angle：30°

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLDM010	□	1	3	60	3
TLDM011	□	1.1	3.3	60	3
TLDM012	□	1.2	3.6	60	3
TLDM013	□	1.3	3.9	60	3
TLDM014	□	1.4	4.2	60	3
TLDM015	□	1.5	4.5	60	3
TLDM016	□	1.6	4.8	60	3
TLDM017	□	1.7	5.1	60	3
TLDM018	□	1.8	5.4	60	3
TLDM019	□	1.9	5.7	60	3
TLDM020	□	2	7	60	4
TLDM021	□	2.1	7.5	60	4
TLDM022	□	2.2	8	60	4
TLDM023	□	2.3	8.5	60	4
TLDM024	□	2.4	9	60	4
TLDM025	□	2.5	9.5	60	4
TLDM026	□	2.6	10	60	4
TLDM027	□	2.7	10.5	60	4
TLDM028	□	2.8	11	60	4
TLDM029	□	2.9	11.5	60	4
TLDM030	□	3	12	60	4
TLDM030-S6	□	3	12	60	6
TLDM031	□	3.1	12	60	4
TLDM031-S6	□	3.1	12	60	6
TLDM032	□	3.2	12	60	4
TLDM032-S6	□	3.2	12	60	6
TLDM033	□	3.3	13	60	4
TLDM033-S6	□	3.3	13	60	6
TLDM034	□	3.4	13	60	4
TLDM034-S6	□	3.4	13	60	6
TLDM035	□	3.5	13	60	4
TLDM035-S6	□	3.5	13	60	6

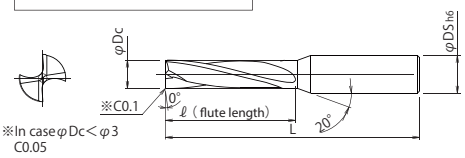
Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLDM036	□	3.6	14	60	4
TLDM036-S6	□	3.6	14	60	6
TLDM037	□	3.7	14	60	4
TLDM037-S6	□	3.7	14	60	6
TLDM038	□	3.8	15	60	4
TLDM038-S6	□	3.8	15	60	6
TLDM039	□	3.9	15	60	4
TLDM039-S6	□	3.9	15	60	6
TLDM040	□	4	15	60	4
TLDM040-S6	□	4	15	60	6
TLDM041	□	4.1	16	60	6
TLDM042	□	4.2	16	60	6
TLDM043	□	4.3	17	60	6
TLDM044	□	4.4	17	60	6
TLDM045	□	4.5	17	60	6
TLDM046	□	4.6	18	65	6
TLDM047	□	4.7	18	65	6
TLDM048	□	4.8	18	65	6
TLDM049	□	4.9	19	65	6
TLDM050	□	5	19	65	6
TLDM051	□	5.1	20	65	6
TLDM052	□	5.2	20	65	6
TLDM053	□	5.3	20	65	6
TLDM054	□	5.4	21	65	6
TLDM055	□	5.5	21	65	6
TLDM056	□	5.6	22	70	6
TLDM057	□	5.7	22	70	6
TLDM058	□	5.8	22	70	6
TLDM059	□	5.9	23	70	6
TLDM060	□	6	23	70	6
TLDM061	□	6.1	23	70	8
TLDM062	□	6.2	24	70	8

□: Stock in Japan

In case of Dc≦12 and Dc=Ds

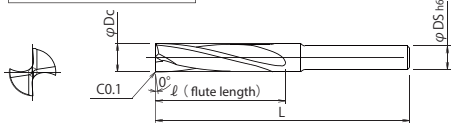


In case of Dc≦12 and Dc<Ds



※In case φDc< φ3
C0.05

In case of Dc>12



□ Tolerance of drill diameter (mm)

Drill dia. φDc	Tolerance
Up to 3	0 −0.010
Over 3 Up to 6	0 −0.012
Over 6 Up to 10	0 −0.015
Over 10	0 −0.018

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLDM063	□	6.3	24	70	8
TLDM064	□	6.4	25	70	8
TLDM065	□	6.5	25	70	8
TLDM066	□	6.6	25	75	8
TLDM067	□	6.7	26	75	8
TLDM068	□	6.8	26	75	8
TLDM069	□	6.9	27	75	8
TLDM070	□	7	27	75	8
TLDM071	□	7.1	27	75	8
TLDM072	□	7.2	28	75	8
TLDM073	□	7.3	28	75	8
TLDM074	□	7.4	28	75	8
TLDM075	□	7.5	29	75	8
TLDM076	□	7.6	29	75	8
TLDM077	□	7.7	30	75	8
TLDM078	□	7.8	30	75	8
TLDM079	□	7.9	30	75	8
TLDM080	□	8	31	75	8
TLDM081	□	8.1	31	75	10
TLDM082	□	8.2	32	75	10
TLDM083	□	8.3	32	75	10
TLDM084	□	8.4	32	75	10
TLDM085	□	8.5	32	75	10
TLDM086	□	8.6	33	80	10
TLDM087	□	8.7	33	80	10
TLDM088	□	8.8	34	80	10
TLDM089	□	8.9	34	80	10
TLDM090	□	9	35	80	10
TLDM091	□	9.1	35	80	10
TLDM092	□	9.2	35	80	10
TLDM093	□	9.3	36	80	10
TLDM094	□	9.4	36	80	10

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLDM095	□	9.5	37	80	10
TLDM096	□	9.6	37	80	10
TLDM097	□	9.7	37	80	10
TLDM098	□	9.8	38	80	10
TLDM099	□	9.9	38	80	10
TLDM100	□	10	39	80	10
TLDM101	□	10.1	39	85	12
TLDM102	□	10.2	39	85	12
TLDM103	□	10.3	40	85	12
TLDM104	□	10.4	40	85	12
TLDM105	□	10.5	40	85	12
TLDM106	□	10.6	41	85	12
TLDM107	□	10.7	41	85	12
TLDM108	□	10.8	42	85	12
TLDM109	□	10.9	42	85	12
TLDM110	□	11	42	85	12
TLDM111	□	11.1	43	85	12
TLDM112	□	11.2	43	85	12
TLDM113	□	11.3	44	85	12
TLDM114	□	11.4	44	85	12
TLDM115	□	11.5	44	85	12
TLDM116	□	11.6	45	90	12
TLDM117	□	11.7	45	90	12
TLDM118	□	11.8	45	90	12
TLDM119	□	11.9	46	90	12
TLDM120	□	12	46	90	12
TLDM125	□	12.5	48	95	12
TLDM130	□	13	50	100	12
TLDM135	□	13.5	52	100	12
TLDM140	□	14	54	100	12

□: Stock in Japan

Line up

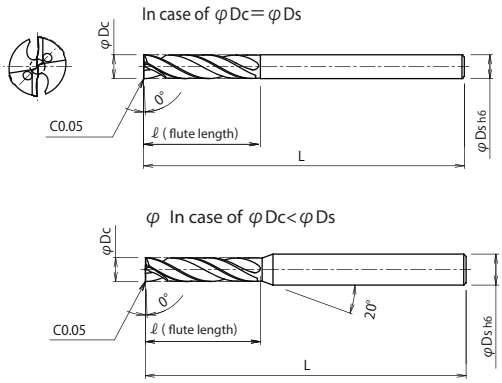
Spot facing drill TLD3D type

Spot facing drill with point angle of 180 °(flat face)
Through coolant hole
Drilling depth 3×Dc
Helix angle：30°
Double margin

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD3DCH0300S03	●	3	14	60	3
TLD3DCH0310S04	●	3.1	14	60	4
TLD3DCH0320S04	●	3.2	15	60	4
TLD3DCH0330S04	●	3.3	15	60	4
TLD3DCH0340S04	●	3.4	16	60	4
TLD3DCH0350S04	●	3.5	16	60	4
TLD3DCH0360S04	●	3.6	17	60	4
TLD3DCH0370S04	●	3.7	17	60	4
TLD3DCH0380S04	●	3.8	18	60	4
TLD3DCH0390S04	●	3.9	18	60	4
TLD3DCH0400S04	●	4	18	60	4
TLD3DCH0410S05	●	4.1	19	65	5
TLD3DCH0420S05	●	4.2	19	65	5
TLD3DCH0430S05	●	4.3	20	65	5
TLD3DCH0440S05	●	4.4	20	65	5
TLD3DCH0450S05	●	4.5	21	65	5
TLD3DCH0460S05	●	4.6	21	65	5
TLD3DCH0470S05	●	4.7	22	65	5
TLD3DCH0480S05	●	4.8	22	65	5
TLD3DCH0490S05	●	4.9	23	65	5
TLD3DCH0500S05	●	5	23	65	5
TLD3DCH0510S06	●	5.1	23	70	6
TLD3DCH0520S06	●	5.2	24	70	6
TLD3DCH0530S06	●	5.3	24	70	6

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD3DCH0540S06	●	5.4	25	70	6
TLD3DCH0550S06	●	5.5	25	70	6
TLD3DCH0560S06	●	5.6	26	70	6
TLD3DCH0570S06	●	5.7	26	70	6
TLD3DCH0580S06	●	5.8	27	70	6
TLD3DCH0590S06	●	5.9	27	70	6
TLD3DCH0600S06	●	6	27	70	6
TLD3DCH0610S07	●	6.1	28	75	7
TLD3DCH0620S07	●	6.2	28	75	7
TLD3DCH0630S07	●	6.3	29	75	7
TLD3DCH0640S07	●	6.4	29	75	7
TLD3DCH0650S07	●	6.5	30	75	7
TLD3DCH0660S07	●	6.6	30	75	7
TLD3DCH0670S07	●	6.7	31	75	7
TLD3DCH0680S07	●	6.8	31	75	7
TLD3DCH0690S07	●	6.9	32	75	7
TLD3DCH0700S07	●	7	32	75	7
TLD3DCH0710S08	●	7.1	32	80	8
TLD3DCH0720S08	●	7.2	33	80	8
TLD3DCH0730S08	●	7.3	33	80	8
TLD3DCH0740S08	●	7.4	34	80	8
TLD3DCH0750S08	●	7.5	34	80	8
TLD3DCH0760S08	●	7.6	35	80	8
TLD3DCH0770S08	●	7.7	35	80	8

●: Standard stock items



☐ Tolerance of drill diameter (mm)

Drill dia. φDc	Tolerance
Up to 3	0 −0.010
Over 3 Up to 6	0 −0.012
Over 6 Up to 10	0 −0.015
Over 10	0 −0.018

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD3DCH0780S08	●	7.8	36	80	8
TLD3DCH0790S08	●	7.9	36	80	8
TLD3DCH0800S08	●	8	36	80	8
TLD3DCH0810S09	●	8.1	37	90	9
TLD3DCH0820S09	●	8.2	37	90	9
TLD3DCH0830S09	●	8.3	38	90	9
TLD3DCH0840S09	●	8.4	38	90	9
TLD3DCH0850S09	●	8.5	39	90	9
TLD3DCH0860S09	●	8.6	39	90	9
TLD3DCH0870S09	●	8.7	40	90	9
TLD3DCH0880S09	●	8.8	40	90	9
TLD3DCH0890S09	●	8.9	41	90	9
TLD3DCH0900S09	●	9	41	90	9
TLD3DCH0910S10	●	9.1	41	95	10
TLD3DCH0920S10	●	9.2	42	95	10
TLD3DCH0930S10	●	9.3	42	95	10
TLD3DCH0940S10	●	9.4	43	95	10
TLD3DCH0950S10	●	9.5	43	95	10
TLD3DCH0960S10	●	9.6	44	95	10
TLD3DCH0970S10	●	9.7	44	95	10
TLD3DCH0980S10	●	9.8	45	95	10
TLD3DCH0990S10	●	9.9	45	95	10
TLD3DCH1000S10	●	10	45	95	10
TLD3DCH1010S11	●	10.1	46	105	11

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD3DCH1020S11	●	10.2	46	105	11
TLD3DCH1030S11	●	10.3	47	105	11
TLD3DCH1040S11	●	10.4	47	105	11
TLD3DCH1050S11	●	10.5	48	105	11
TLD3DCH1060S11	●	10.6	48	105	11
TLD3DCH1070S11	●	10.7	49	105	11
TLD3DCH1080S11	●	10.8	49	105	11
TLD3DCH1090S11	●	10.9	50	105	11
TLD3DCH1100S11	●	11	50	105	11
TLD3DCH1110S12	●	11.1	50	115	12
TLD3DCH1120S12	●	11.2	51	115	12
TLD3DCH1130S12	●	11.3	51	115	12
TLD3DCH1140S12	●	11.4	52	115	12
TLD3DCH1150S12	●	11.5	52	115	12
TLD3DCH1160S12	●	11.6	53	115	12
TLD3DCH1170S12	●	11.7	53	115	12
TLD3DCH1180S12	●	11.8	54	115	12
TLD3DCH1190S12	●	11.9	54	115	12
TLD3DCH1200S12	●	12	54	115	12
TLD3DCH1250S13	●	12.5	57	125	13
TLD3DCH1300S13	●	13	59	125	13
TLD3DCH1350S14	●	13.5	61	130	14
TLD3DCH1400S14	●	14	63	130	14

●: Standard stock items

Line up

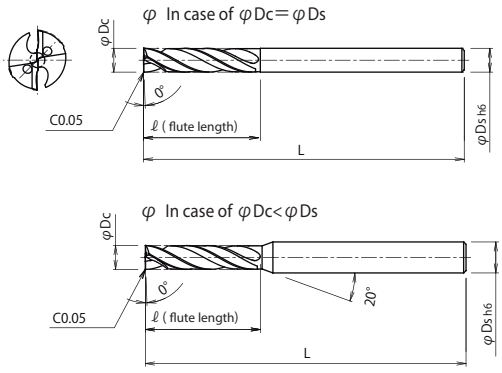
Spot facing drill TLD5D type

Spot facing drill with point angle of 180 °(flat face)
Through coolant hole
Drilling depth 5×Dc
Helix angle：30°
Double margin

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD5DCH0300S03	□	3	20	70	3
TLD5DCH0310S04	□	3.1	21	70	4
TLD5DCH0320S04	□	3.2	22	70	4
TLD5DCH0330S04	□	3.3	22	70	4
TLD5DCH0340S04	□	3.4	23	70	4
TLD5DCH0350S04	□	3.5	24	70	4
TLD5DCH0360S04	□	3.6	24	70	4
TLD5DCH0370S04	□	3.7	25	70	4
TLD5DCH0380S04	□	3.8	26	70	4
TLD5DCH0390S04	□	3.9	26	70	4
TLD5DCH0400S04	□	4	27	70	4
TLD5DCH0410S05	□	4.1	28	80	5
TLD5DCH0420S05	□	4.2	28	80	5
TLD5DCH0430S05	□	4.3	29	80	5
TLD5DCH0440S05	□	4.4	30	80	5
TLD5DCH0450S05	□	4.5	30	80	5
TLD5DCH0460S05	□	4.6	31	80	5
TLD5DCH0470S05	□	4.7	32	80	5
TLD5DCH0480S05	□	4.8	32	80	5
TLD5DCH0490S05	□	4.9	33	80	5
TLD5DCH0500S05	□	5	34	80	5
TLD5DCH0510S06	□	5.1	34	85	6
TLD5DCH0520S06	□	5.2	35	85	6
TLD5DCH0530S06	□	5.3	36	85	6

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD5DCH0540S06	□	5.4	36	85	6
TLD5DCH0550S06	□	5.5	37	85	6
TLD5DCH0560S06	□	5.6	38	85	6
TLD5DCH0570S06	□	5.7	38	85	6
TLD5DCH0580S06	□	5.8	39	85	6
TLD5DCH0590S06	□	5.9	40	85	6
TLD5DCH0600S06	□	6	40	85	6
TLD5DCH0610S07	□	6.1	41	95	7
TLD5DCH0620S07	□	6.2	42	95	7
TLD5DCH0630S07	□	6.3	42	95	7
TLD5DCH0640S07	□	6.4	43	95	7
TLD5DCH0650S07	□	6.5	44	95	7
TLD5DCH0660S07	□	6.6	44	95	7
TLD5DCH0670S07	□	6.7	45	95	7
TLD5DCH0680S07	□	6.8	46	95	7
TLD5DCH0690S07	□	6.9	46	95	7
TLD5DCH0700S07	□	7	47	95	7
TLD5DCH0710S08	□	7.1	48	100	8
TLD5DCH0720S08	□	7.2	48	100	8
TLD5DCH0730S08	□	7.3	49	100	8
TLD5DCH0740S08	□	7.4	50	100	8
TLD5DCH0750S08	□	7.5	50	100	8
TLD5DCH0760S08	□	7.6	51	100	8
TLD5DCH0770S08	□	7.7	52	100	8

□:Stock in Japan



☐ Tolerance of drill diameter (mm)

Drill dia. φDc	Tolerance
Up to 3	0 −0.010
Over 3 Up to 6	0 −0.012
Over 6 Up to 10	0 −0.015
Over 10	0 −0.018

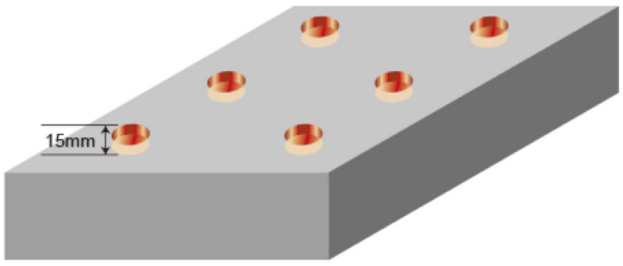
Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD5DCH0780S08	☐	7.8	52	100	8
TLD5DCH0790S08	☐	7.9	53	100	8
TLD5DCH0800S08	☐	8	54	100	8
TLD5DCH0810S09	☐	8.1	54	110	9
TLD5DCH0820S09	☐	8.2	55	110	9
TLD5DCH0830S09	☐	8.3	56	110	9
TLD5DCH0840S09	☐	8.4	56	110	9
TLD5DCH0850S09	☐	8.5	57	110	9
TLD5DCH0860S09	☐	8.6	58	110	9
TLD5DCH0870S09	☐	8.7	58	110	9
TLD5DCH0880S09	☐	8.8	59	110	9
TLD5DCH0890S09	☐	8.9	60	110	9
TLD5DCH0900S09	☐	9	60	110	9
TLD5DCH0910S10	☐	9.1	61	120	10
TLD5DCH0920S10	☐	9.2	62	120	10
TLD5DCH0930S10	☐	9.3	62	120	10
TLD5DCH0940S10	☐	9.4	63	120	10
TLD5DCH0950S10	☐	9.5	64	120	10
TLD5DCH0960S10	☐	9.6	64	120	10
TLD5DCH0970S10	☐	9.7	65	120	10
TLD5DCH0980S10	☐	9.8	66	120	10
TLD5DCH0990S10	☐	9.9	66	120	10
TLD5DCH1000S10	☐	10	67	120	10
TLD5DCH1010S11	☐	10.1	68	130	11

Item code	Stock	Dimensions (mm)			
		φDc	ℓ	L	φDs
TLD5DCH1020S11	☐	10.2	68	130	11
TLD5DCH1030S11	☐	10.3	69	130	11
TLD5DCH1040S11	☐	10.4	70	130	11
TLD5DCH1050S11	☐	10.5	70	130	11
TLD5DCH1060S11	☐	10.6	71	130	11
TLD5DCH1070S11	☐	10.7	72	130	11
TLD5DCH1080S11	☐	10.8	72	130	11
TLD5DCH1090S11	☐	10.9	73	130	11
TLD5DCH1100S11	☐	11	74	130	11
TLD5DCH1110S12	☐	11.1	74	145	12
TLD5DCH1120S12	☐	11.2	75	145	12
TLD5DCH1130S12	☐	11.3	76	145	12
TLD5DCH1140S12	☐	11.4	76	145	12
TLD5DCH1150S12	☐	11.5	77	145	12
TLD5DCH1160S12	☐	11.6	78	145	12
TLD5DCH1170S12	☐	11.7	78	145	12
TLD5DCH1180S12	☐	11.8	79	145	12
TLD5DCH1190S12	☐	11.9	80	145	12
TLD5DCH1200S12	☐	12	80	145	12
TLD5DCH1250S13	☐	12.5	84	155	13
TLD5DCH1300S13	☐	13	87	155	13
TLD5DCH1350S14	☐	13.5	90	160	14
TLD5DCH1400S14	☐	14	94	160	14

☐: Stock in Japan

Cutting data

Spot facing for stainless steel



result

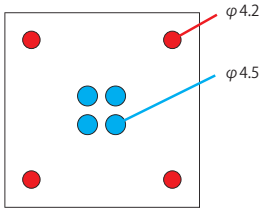
Replacement from competitor E's HSS spot facing end mill. TLDM achieved smooth cutting in spite of stainless steel.

Work	Part name		Test piece
	Material		Stainless steel (1.4301)
	Hardness		—
Tool	Item code		TLDM110 (φ11)
	Grade		DZ coat (TiAlN)
Cutting conditions	Spindle speed	n	n=875min^{-1}
	Cutting speed	Vc	Vc=30m/min
	speed	Vf	Vf=87mm/min
	Feed	f	f=0.1mm/rev
	Drilling depth		15mm (Blind)
	Clamp		Good
	Coolant		Water soluble (external)
	Machine		Double column MC

2424

Drilling for stainless steel

Work thickness : 4mm



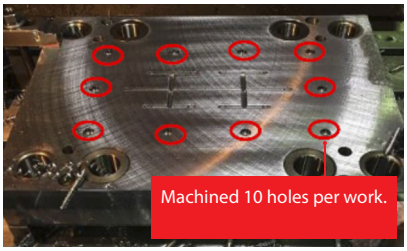
result

Current method: Plunging and circular interpolation by competitor A's 3 flutes solid end mill. Improved method: TLDM could drill 400 works and achieved small burr formation & good hole accuracy, and still continue drilling. Furthermore, TLDM reduced the machining time from 15 to 2 seconds per 1 hole.

Work	Part name		Plate
	Material		Stainless steel (1.4301)
	Hardness		—
Tool	Item code		TLDM042(φ4.2)
	Grade		DZ coat (TiAlN)
Cutting conditions	Spindle speed	n	n=2,300min^{-1}
	Cutting speed	Vc	Vc=30m/min
	speed	Vf	Vf=150mm/min
	Feed	f	f=0.065mm/rev
	Drilling depth		4mm (Thru.)
	Clamp		Good
	Coolant		Water soluble (external)
	Machine		VerticalMC

2486

Spot facing for carbon steel



□Quality of hole

result

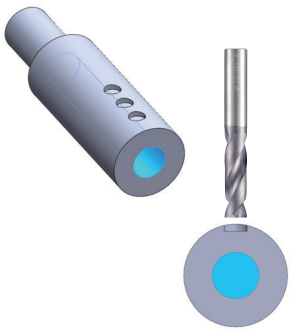
In spot facing 10 holes per work, TLDM reduced the machining time to less than one sixth of competitor E's HSS spot facing end mill. And achieved good hole accuracy & good surface finish (TLDM is still able to continue).

Work	Part name		Die plate
	Material		Carbon steel (C55)
	Hardness		—
Tool	Item code		TLDM110 (φ11)
	Grade		DZ coat (TiAlN)
Cutting conditions	Spindle speed	*n*	*n*=2,325 min^{-1}
	Cutting speed	*Vc*	*Vc*=80m/min
	speed	*Vf*	*Vf*=510mm/min
	Feed	*f*	*f*=0.22mm/rev
	Drilling depth		7mm (with φ7 pilot hple)
	Clamp		Good
	Coolant		Water soluble (external)
	Machine		VerticalMC

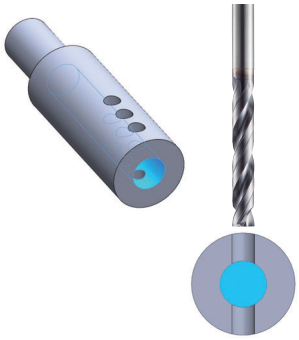
2465

Drilling crossed hole for stainless steel (Example of process combining)

Guide drilling on cylindrical surface with TLDM



Drilling crossed hole(Thru) with TLD5D



result

Achieved 1,000 holes, still able to continue.
Replacement from endmilling and drilling.Spot facing drill reduce burrs, improves hole accuracy and surface finish, and improves efficiency.

			Tool	
			TLDM031	TLD5DCH0310S04
Work	Part name		Parts for medical devices	
	Material		SUS304	
Cutting conditions	Spindle speed	*n*	*n*=3,080min^{-1}	
	Cutting speed	*Vc*	*Vc*=30m/min	
	Feed speed	*Vf*	*Vf*=310mm/min	
	Feed	*f*	*f*=0.1mm/rev	
	Drilling depth		3mm	14mm
	Blind or Thru.		Blind	Thru.
	Clamp		Good	
	Coolant		Water soluble (external)	Water soluble (internal)
	Machine		VerticalMC	

4435

Recommended cutting conditions

Spot facing drill TLDM type

Work materials	Steel for structure Below 180HB		Carbon steel (C50) Below 250HB		Alloy steel (1.7223) 280～350HB	
Cutting speed *Vc* (m/min)	50-100		50-100		30-70	
Feed *f* (mm/rev)	0.01-0.05(φ1-φ 2) 0.06-0.24(φ3-φ14)		0.01-0.05(φ1-φ 2) 0.06-0.24(φ3-φ14)		0.01-0.04(φ1-φ 2) 0.06-0.24(φ3-φ14)	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
1	19,100	380	19,100	380	12,700	250
2	11,100	380	11,100	380	8,000	250
3	8,500	510	8,500	510	6,375	380
4	6,375	510	6,375	510	4,775	380
5	5,100	510	5,100	510	3,825	380
6	4,250	510	4,250	510	3,175	380
7	3,650	510	3,650	510	2,725	380
8	3,175	510	3,175	510	2,375	380
9	2,825	510	2,825	510	2,125	380
10	2,550	510	2,550	510	1,900	380
11	2,325	465	2,325	465	1,725	345
12	2,125	425	2,125	425	1,600	320
13	1,950	390	1,950	390	1,475	295
14	1,825	365	1,825	365	1,375	275

Work materials	Mold Steel (P21) 38～43HRC		Hardened diesteel (1.2344) Below 50HRC		Titanium alloy 30～42HRC	
Cutting speed *Vc* (m/min)	20-40(φ1-φ 2) 20-50(φ3-φ14)		15-30		20-40(φ1-φ 2) 20-50(φ3-φ14)	
Feed *f* (mm/rev)	0.005-0.03(φ1-φ 2) 0.06 -0.20(φ3-φ14)		0.005-0.03(φ1-φ 2) 0.03 -0.12(φ3-φ14)		0.005-0.03(φ1-φ 2) 0.06 -0.20(φ3-φ14)	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
1	9,500	100	6,400	50	9,500	100
2	4,800	100	3,200	50	4,800	100
3	3,175	320	2,125	100	3,175	320
4	2,375	240	1,600	80	2,375	240
5	1,900	200	1,275	70	1,900	200
6	1,600	170	1,050	60	1,600	170
7	1,375	150	900	60	1,375	150
8	1,200	140	800	50	1,200	140
9	1,050	120	700	50	1,050	120
10	950	110	625	50	950	110
11	875	110	575	50	875	110
12	800	100	525	40	800	100
13	725	90	500	40	725	90
14	675	90	450	40	675	90

Attention for use

1. Above cutting conditions are for drilling flat surface. In case of drilling inclined surface, the figure to be adjusted as below:
   For inclined angle under 30°, reduce Feed speed (Vf) to 40-80%, and for inclined angle 30° or more, reduce Feed speed (Vf) to 20-50%.
2. Above cutting conditions are for drilling with water soluble. In case of dry cutting, use air blow to remove the chips.
3. Recommend drilling depth under 2D or less. Drilling depth over 2D is not recommended.
4. Endmilling is impossible.
5. In case of machining heat-resistant alloy, using 0.5mm step feed.
6. In case of long chips evacuated, adjust above conditions by increasing Feed speed or using step feed for breaking chips.

Work materials	Inconel 30～42HRC		Stainless steel Below 280HB		Grey cast iron (GG25) Below 350MPa	
Cutting speed *Vc* (m/min)	10-20		10-40(φ1-φ2) 10-50(φ3-φ14)		50-100	
Feed *f* (mm/rev)	0.005-0.03(φ1-φ 2) 0.01 -0.04(φ3-φ14)		0.005-0.03(φ1-φ 2) 0.06 -0.20(φ3-φ14)		0.01-0.05(φ1-φ 2) 0.06-0.24(φ3-φ14)	
Drill dia. (mm))	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
1	3,800	38	9,500	100	19,100	380
2	1,900	19	4,800	100	11,100	380
3	1,275	26	3,175	320	8,500	510
4	950	19	2,375	240	6,375	510
5	775	16	1,900	200	5,100	510
6	625	13	1,600	170	4,250	510
7	550	11	1,375	150	3,650	510
8	475	10	1,200	140	3,175	510
9	425	9	1,050	120	2,825	510
10	375	8	950	110	2,550	510
11	350	7	875	110	2,325	465
12	325	7	800	100	2,125	425
13	300	6	725	90	1,950	390
14	275	6	675	90	1,825	365

Work materials	Nodular cast iron (GGG40) Below 450MPa		Aluminum alloy	
Cutting speed *Vc* (m/min)	50-100		50-150	
Feed *f* (mm/rev)	0.01-0.05(φ1-φ 2) 0.06-0.24(φ3-φ14)		0.01-0.08(φ1-φ 2) 0.06-0.24(φ3-φ14)	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
1	19,100	380	25,500	800
2	11,100	380	15,900	800
3	8,500	510	12,725	770
4	6,375	510	9,550	770
5	5,100	510	7,650	770
6	4,250	510	6,375	770
7	3,650	510	5,450	770
8	3,175	510	4,775	770
9	2,825	510	4,250	770
10	2,550	510	3,825	770
11	2,325	465	3,475	695
12	2,125	425	3,175	635
13	1,950	390	2,950	590
14	1,825	365	2,725	545

Recommended cutting conditions

Spot facing drill TLD3D type

Work materials	Steel for structure Below 180HB		Carbon steel (C50) Below 250HB		Alloy steel (1.7223) 280～350HB	
Cutting speed *Vc* (m/min)	50-100		50-100		50-80	
Feed *f* (mm/rev)	0.06-0.24		0.06-0.24		0.06-0.24	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	8,500	510	8,500	510	6,375	380
4	6,375	510	6,375	510	4,775	380
5	5,100	510	5,100	510	3,825	380
6	4,250	510	4,250	510	3,175	380
7	3,650	510	3,650	510	2,725	380
8	3,175	510	3,175	510	2,375	380
9	2,825	510	2,825	510	2,125	380
10	2,550	510	2,550	510	1,900	380
11	2,325	465	2,325	465	1,725	345
12	2,125	425	2,125	425	1,600	320
13	1,950	390	1,950	390	1,475	295
14	1,825	365	1,825	365	1,375	275

Work materials	Mold Steel (P21) 38～43HRC		Hardened diesteel (1.2344) Below 50HRC		Titanium alloy 30～42HRC	
Cutting speed *Vc* (m/min)	20-50		20-50		20-50	
Feed *f* (mm/rev)	0.06-0.20		0.08-0.20		0.06-0.20	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	3,175	320	3,700	300	3,175	320
4	2,375	240	2,790	260	2,375	240
5	1,900	200	2,230	200	1,900	200
6	1,600	170	1,860	160	1,600	170
7	1,375	150	1,590	150	1,375	150
8	1,200	140	1,390	140	1,200	140
9	1,050	120	1,340	140	1,050	120
10	950	110	1,110	130	950	110
11	875	110	1,010	120	875	110
12	800	100	930	120	800	100
13	725	90	860	120	725	90
14	675	90	800	120	675	90

Attention for use

1. Above cutting conditions are for drilling flat surface. In case of drilling inclined surface, the figure to be adjusted as below:
   For inclined angle under 30°, reduce Feed speed (Vf) to 40-80%, and for inclined angle 30° or more, reduce Feed speed (Vf) to 20-50%.
   But, keep spindle speed (n).
2. Above cutting conditions are for drilling with water soluble (internal coolant). In case of external coolant, use step feed to remove the chips.
   Dry drilling is not recommended.
3. Recommend drilling depth under 3D or less. In case of drilling depth over 3D, recommend to use TLD5D type.
4. Endmilling is impossible.
5. In case of long chips evacuated, adjust above conditions by increasing Feed speed or using step feed for breaking chips.

Work materials	Stainless steel Below 280HB		Grey cast iron (GG25) Below 350MPa		Nodular cast iron (GGG40) Below 450MPa	
Cutting speed *Vc* (m/min)	25-50		50-100		50-100	
Feed *f* (mm/rev)	0.06-0.20		0.06-0.24		0.06-0.24	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	3,175	320	8,500	510	8,500	510
4	2,375	240	6,375	510	6,375	510
5	1,900	200	5,100	510	5,100	510
6	1,600	170	4,250	510	4,250	510
7	1,375	150	3,650	510	3,650	510
8	1,200	140	3,175	510	3,175	510
9	1,050	120	2,825	510	2,825	510
10	950	110	2,550	510	2,550	510
11	875	110	2,325	465	2,325	465
12	800	100	2,125	425	2,125	425
13	725	90	1,950	390	1,950	390
14	675	90	1,825	365	1,825	365

Work materials	Aluminum alloy	
Cutting speed *Vc* (m/min)	120-200	
Feed *f* (mm/rev)	0.05-0.15	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	16,980	1,698
4	12,730	1,273
5	10,190	1,019
6	8,490	849
7	7,280	728
8	6,370	637
9	5,660	566
10	5,090	509
11	4,630	463
12	4,240	424
13	3,920	392
14	3,640	364

Recommended cutting conditions

Spot facing drill TLD5D type

Work materials	Steel for structure Below 180HB		Carbon steel (C50) Below 250HB		Alloy steel (1.7223) 280～350HB	
Cutting speed *Vc* (m/min)	50-100		50-100		50-80	
Feed *f* (mm/rev)	0.06-0.24		0.06-0.24		0.06-0.24	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	8,500	510	8,500	510	6,375	380
4	6,375	510	6,375	510	4,775	380
5	5,100	510	5,100	510	3,825	380
6	4,250	510	4,250	510	3,175	380
7	3,650	510	3,650	510	2,725	380
8	3,175	510	3,175	510	2,375	380
9	2,825	510	2,825	510	2,125	380
10	2,550	510	2,550	510	1,900	380
11	2,325	465	2,325	465	1,725	345
12	2,125	425	2,125	425	1,600	320
13	1,950	390	1,950	390	1,475	295
14	1,825	365	1,825	365	1,375	275

Work materials	Mold Steel (P21) 38～43HRC		Hardened diesteel (1.2344) Below 50HRC		Titanium alloy 30～42HRC	
Cutting speed *Vc* (m/min)	20-50		30-50		20-50	
Feed *f* (mm/rev)	0.06-0.20		0.08-0.20		0.06-0.20	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	3,175	320	4,240	340	3,175	320
4	2,375	240	3,180	260	2,375	240
5	1,900	200	2,550	200	1,900	200
6	1,600	170	2,120	190	1,600	170
7	1,375	150	1,820	190	1,375	150
8	1,200	140	1,590	180	1,200	140
9	1,050	120	1,420	180	1,050	120
10	950	110	1,270	170	950	110
11	875	110	1,160	170	875	110
12	800	100	1,060	160	800	100
13	725	90	980	150	725	90
14	675	90	910	150	675	90

Attention for use

1. The above is cutting conditions in the case with guide hole drilling of the same diameter drill (guide hole drilling depth: 0.5D-1.0D).
2. Above cutting conditions is for drilling with water soluble (internal coolant). External coolant or dry drilling is not recommended.
3. Recommend drilling depth under 5D or less. Drilling depth over 5D is not recommended.
4. Endmilling is impossible.
5. In case of long chips evacuated, adjust above conditions by increasing Feed speed or using step feed for breaking chips.

Work materials	Stainless steel Below 280HB		Grey cast iron (GG25) Below 350MPa		Nodular cast iron (GGG40) Below 450MPa	
Cutting speed *Vc* (m/min)	25-50		50-100		50-100	
Feed *f* (mm/rev)	0.06-0.20		0.06-0.24		0.06-0.24	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	3,175	320	8,500	510	8,500	510
4	2,375	240	6,375	510	6,375	510
5	1,900	200	5,100	510	5,100	510
6	1,600	170	4,250	510	4,250	510
7	1,375	150	3,650	510	3,650	510
8	1,200	140	3,175	510	3,175	510
9	1,050	120	2,825	510	2,825	510
10	950	110	2,550	510	2,550	510
11	875	110	2,325	465	2,325	465
12	800	100	2,125	425	2,125	425
13	725	90	1,950	390	1,950	390
14	675	90	1,825	365	1,825	365

Work materials	Aluminum alloy	
Cutting speed *Vc* (m/min)	120-200	
Feed *f* (mm/rev)	0.05-0.15	
Drill dia. (mm)	Spindle speed *n* (min^{-1})	Feed speed *Vf* (mm/min)
3	16,980	1,698
4	12,730	1,273
5	10,190	1,019
6	8,490	849
7	7,280	728
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9	5,660	566
10	5,090	509
11	4,630	463
12	4,240	424
13	3,920	392
14	3,640	364

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