

Tungaloy

Member IMC Group

Tungaloy Report No. 420-E

DRILLLINE Deep hole drilling tool

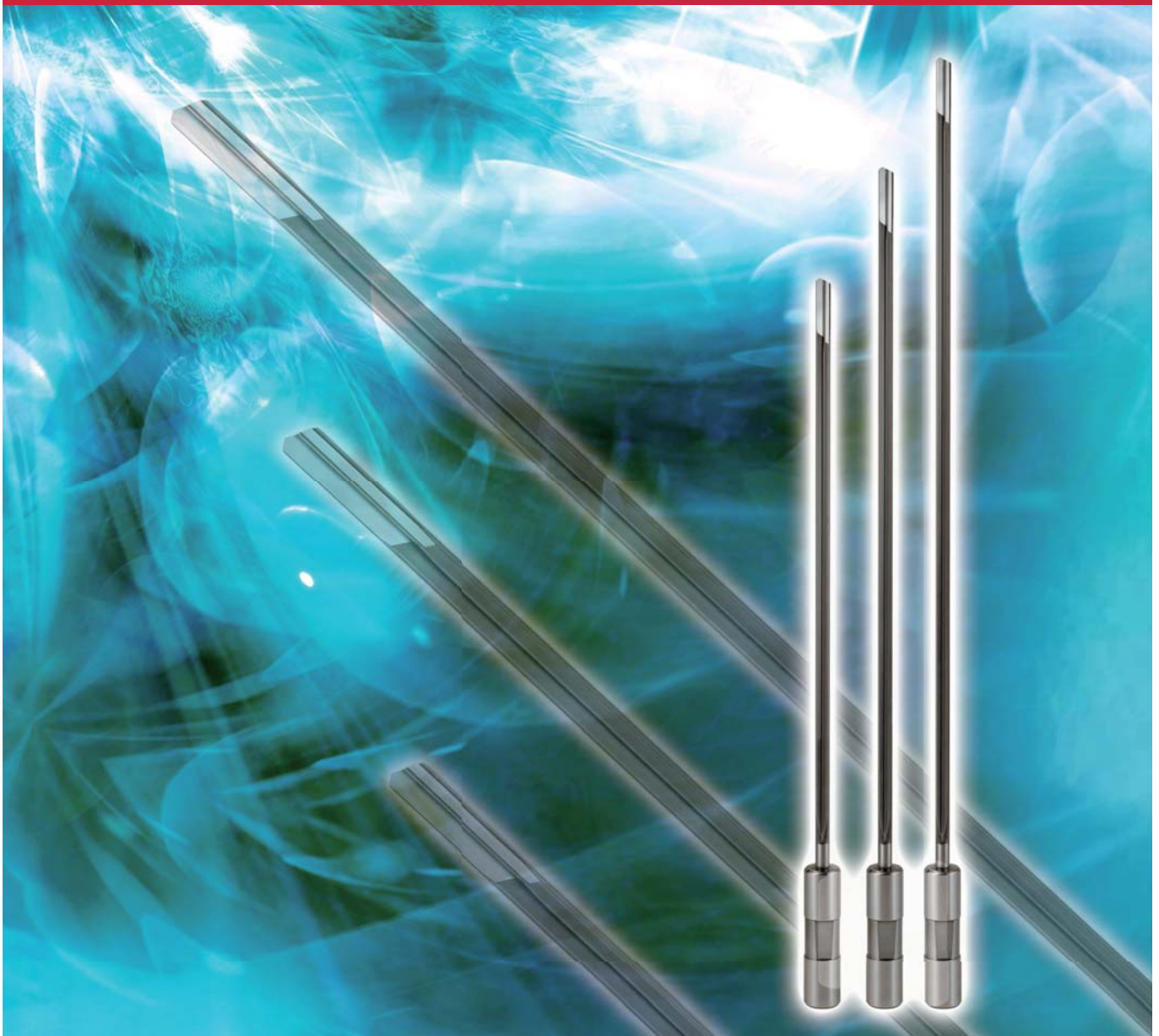
GUNDRILL

TUNGALOY

NEW

SLJ type -Single flute brazed Gundrills

Ideal tool for small & deep hole!



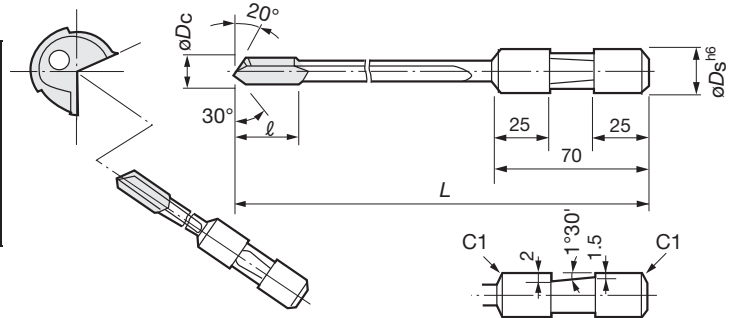
Ideal drilling tool for highly accurate deep hole!

Drill body



Specifications of A type drivers

Tool dia. ϕD_c (mm)	Driver dia. ϕD_s (mm)
$3.00 \leq \phi D_c < 5.50$	12.70
$5.50 \leq \phi D_c < 12.70$	19.05
$12.70 \leq \phi D_c < 20.00$	25.40
$20.00 \leq \phi D_c \leq 24.00$	31.75



Stock

Tool dia. ϕD_c (mm)	Cat. No. Overall length L: 400 (mm)	Stock	Cat. No. Overall length L: 600 (mm)	Stock	Cat. No. Overall length L: 1000 (mm)	Stock	Cat. No. Overall length L: 1250 (mm)	Stock	Cat. No. Overall length L: 1650 (mm)	Stock
3	SLJ0300L0400NA	●	SLJ0300L0600NA	●						
5			SLJ0500L0600NA	●	SLJ0500L1000NA	●				
5.5			SLJ0550L0600NA	●						
6			SLJ0600L0600NA	●	SLJ0600L1000NA	●	SLJ0600L1250NA	●	SLJ0600L1650NA	●
6.1							SLJ0610L1250NA	●	SLJ0610L1650NA	●
6.2							SLJ0620L1250NA	●	SLJ0620L1650NA	●
7			SLJ0700L0600NA	●	SLJ0700L1000NA	●	SLJ0700L1250NA	●	SLJ0700L1650NA	●
8			SLJ0800L0600NA	●	SLJ0800L1000NA	●	SLJ0800L1250NA	●	SLJ0800L1650NA	●
8.1							SLJ0810L1250NA	●	SLJ0810L1650NA	●
8.2							SLJ0820L1250NA	●	SLJ0820L1650NA	●
10			SLJ1000L0600NA	●	SLJ1000L1000NA	●	SLJ1000L1250NA	●	SLJ1000L1650NA	●
10.1							SLJ1010L1250NA	●	SLJ1010L1650NA	●
10.2							SLJ1020L1250NA	●	SLJ1020L1650NA	●
12							SLJ1200L1250NA	●	SLJ1200L1650NA	●
12.1							SLJ1210L1250NA	●	SLJ1210L1650NA	●
12.2							SLJ1220L1250NA	●	SLJ1220L1650NA	●

* Other sized drills are also made to order.

● : Stocked items

Guidelines for attainable accuracies

Workpiece materials	Surface roughness (μm)	Roundness (μm)	Cylindricity (μm)	Over size (μm)
Carbon and alloy steels	6 - 25	5 - 10	10 - 15	-5 - 30
Cast irons (FC, FCD / GG, GGG)	3 - 15	3 - 5	5 - 10	-5 - 15
Aluminium alloys, Copper alloys	0.3 - 6	3 - 5	5 - 10	-10 - 5

Note: Over size values given in the table are based on the tool diameter.

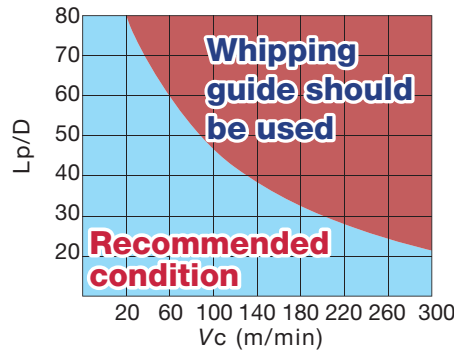
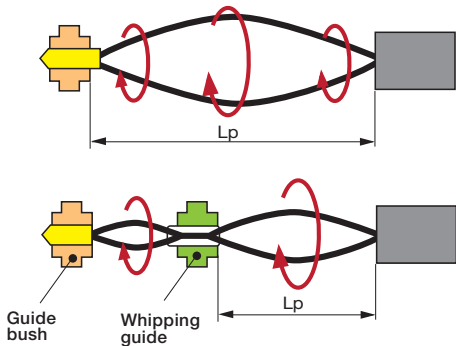
Tip length

Tool dia. ϕD_c (mm)	Tip length l (mm)
$3.0 \leq \phi D_c < 4.0$	15
$4.0 \leq \phi D_c < 5.0$	20
$5.0 \leq \phi D_c < 10.0$	25
$10.0 \leq \phi D_c < 15.0$	30
$15.0 \leq \phi D_c < 20.0$	35
$20.0 \leq \phi D_c \leq 24.0$	40

Precautions

Whipping guide

When using long GunDrill at high speed, steel pipe encounters whipping effect due to centrifugal force. This phenomenon is strongly affected with cutting speed and pipe length. Red colored portion in the following graph shows the area in which whipping guide should be used.



Coolant

A water-insoluble fluid is recommended in machining with GunDrills. When using water soluble fluid, use the fluid for heavy duty cutting in higher concentration.

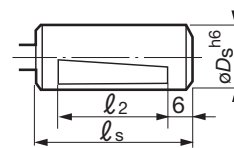
Available range of special order tool

Minimum order quantity	3 pcs
Available range	Tool diameter: $\phi D_c = 3.0 - 24.0$ mm Overall length: shown in table below Driver type: A or M type (shown in fig. below) Note: If another type of driver is needed, please confirm when requesting quotation. Grade: G2F Note: Coated gundrill is not available.

Available range of overall length

Tool diameter range ϕD_c (mm)	Overall length L max (mm)
$3.0 \leq \phi D_c < 4.1$	800
$4.1 \leq \phi D_c < 4.9$	1250
$4.9 \leq \phi D_c < 24.0$	2000

M type



Tool dia. ϕD_c (mm)	Driver dia. ϕD_s (mm)		
	ϕD_s	l_s	l_2
$3.00 \leq \phi D_c < 14.00$	20	50	38
$14.00 \leq \phi D_c < 20.00$	25	55	43
$20.00 \leq \phi D_c \leq 24.00$	32	60	48

Example of tool designation

LJ - 5.0 L600 A 19.05

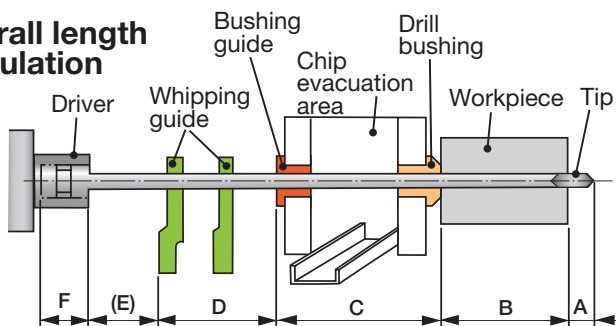
1 Series	
LJ	GunDrill
4 Driver code	
A	A
M	M
S	Special

2 Tool diameter: ϕD_c (mm)	
5.0	$\phi 5.0$
10.99	$\phi 10.99$

3 Overall length: L (mm)	
L600	600
L1010	1010

5 Driver diameter: ϕD_s (mm)	
19.05	$\phi 19.05$
20	$\phi 20.00$

Overall length calculation

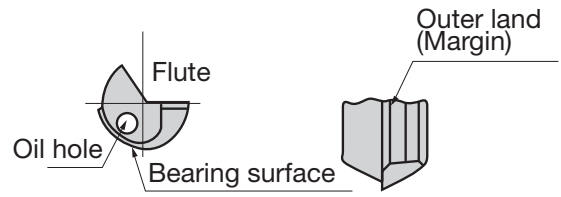
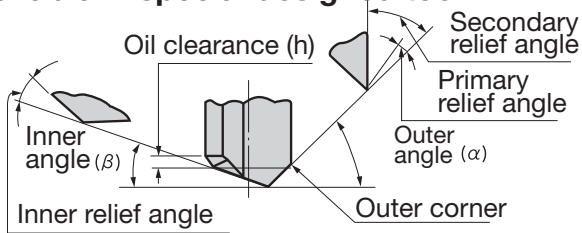


Overall length = A + B + C + D + (E) + F

- A : Regrinding area
- B : Hole depth
- C : Length of chip evacuation area
- D : Length for whipping guide
- (E) : Some margin
- F : Driver length

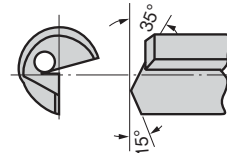
Amount of oil clearance

Available in special designed tool

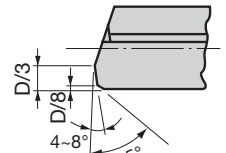


Bevel-style point geometry

Tool dia. ϕDc (mm)	Cutting edge angles	Oil clearance h (mm)	
		$\alpha = 42^\circ$ $\beta = 20^\circ$	$\alpha = 30^\circ$ $\beta = 20^\circ$
$3.2 \leq \phi Dc < 6.4$		0.7	$(0.1\phi Dc + 0.4)$
$6.42 \leq \phi Dc < 9.5$		0.8	$(0.1\phi Dc + 0.6)$
$9.52 \leq \phi Dc < 12.7$		1.1	2.0
$12.72 \leq \phi Dc < 15.9$		1.5	3.0
$15.92 \leq \phi Dc < 19.0$		2.0	4.0
$19.02 \leq \phi Dc < 22.0$		2.4	4.5
$22.0 \leq \phi Dc \leq 24.0$		2.6	5.0



Notch-style point geometry



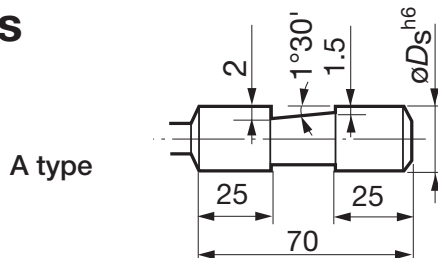
Stuck-style point geometry

Note: α = Outer angle, β = Inner angle, ϕDc = Tool dia.

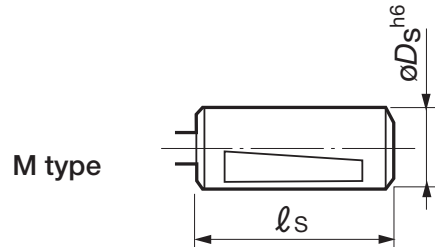
Selection of cutting edge angle

Type	Outer angle α	Suitable materials	Note
No.1	30°	Grey cast irons, Stainless steels	Standard spec.
No.2	42°	Carbon steels, Alloy steels	-
No.3	15°	Brittle workpiece materials	-

Drivers



A type



M type

Information sheet for quotation

Company:

Name:

Tel:

*② Tool diameter: ϕDc	$\phi Dc =$ mm hole tolerance (required)	* Gundrilling depth: H Flute length: l	$H =$ mm $l =$ mm
*③ Overall length: L	$L =$ mm	Workpiece material	
*④ Driver code A or M type**		Machine	• Gundrill machine • Others ()

* Required item

** If another type of driver is needed, please inform the specification of driver on this sheet.

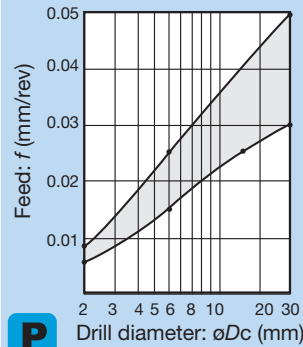
Standard cutting condition

Workpiece materials	Heat treatment	Hardness		Cutting speed V_c (m/min)	Feed f (mm/rev)
		HB	HRC		
Free-cutting carbon steels					
S10C ~ S15C	Cold drawn	160 - 190	(5) - (11)	130	Refer to Fig. 1
S30C ~ S50C	Cold drawn	200 - 230	(12) - 20	100	
S35C ~ S50C	Hardened and tempered	250 - 300	25 - 32	80	
Carbon steels					
S10C ~ S35C	Annealed	110 ~ 120		130	Refer to Fig. 2
S10C ~ S50C	Annealed	120 ~ 185	~ (9)	120	
S50C ~	Annealed	170 ~ 200	(5) ~ (13)	100	
S20C ~ S30C	Hardened and tempered	210 ~ 250	(16) ~ 24	90	Refer to Fig. 2
S30C ~ S55C	Hardened and tempered	260 ~ 310	26 ~ 33	70	
S50C ~	Hardened and tempered	320 ~ 375	34 ~ 40	50	
S55C ~	Hardened and tempered	380 ~ 440	41 ~ 47	40	
Cast steels SCr, SNC SNCM, SCM SMn etc.	Annealed	150 ~ 230	~ (20)	90	Refer to Fig. 2
	Annealed or Hardened and tempered	240 ~ 310	23 ~ 33	70	Refer to Fig. 2
		315 ~ 370	34 ~ 40	50	Refer to Fig. 3
		380 ~ 440	40 ~ 47	40	
	450 ~ 500	48 ~ 51	30		
Cast steels SC	Hardened and tempered	140 ~ 180	~ (8)	100	Refer to Fig. 2
	Annealed	190 ~ 240	(11) ~ 22	90	
Tool steels SKS, SKD etc.	Annealed	150 ~ 200	~ (13)	70	Refer to Fig. 3
	Annealed	210 ~ 300	(16) ~ 32	50	
Stainless steels Ferritic SUS405, 430	Annealed	150 ~ 200	~ (13)	70	Refer to Fig. 3
Austenitic SUS304, 305	Annealed	160 ~ 220	~ (18)	50	
Martensitic SUS403, 410	Hardened and tempered	160 ~ 220	~ (18)	70	
Grey cast irons FC100 ~ 350		110 ~ 180		90	Refer to Fig. 4
		190 ~ 220		80	
		220 ~ 260		70	
Ductile cast irons FCD400 ~ 700		120 ~ 170		80	Refer to Fig. 5
		180 ~ 240		65	
		240 ~ 280		55	
		260 ~ 320		40	
Malleable cast irons FCMB FCMP		110 ~ 180		90	Refer to Fig. 5
		190 ~ 220		80	
		220 ~ 260		70	
Cast aluminium alloys AC3A etc. Aluminium die cast alloys	Annealed	5000load 40 ~ 100		180	Refer to Fig. 4
Copper alloys	Annealed	120 ~ 160		< 150	Refer to Fig. 4
		160 ~ 205		< 150	Refer to Fig. 5
Bearing steels		150 ~ 210		70	Refer to Fig. 3
Difficult to cut material				20	
High speed steels		210 ~ 285	(16) ~ 30	50	

- No. of revolutions: n (min⁻¹) = Cutting speed: V_c (m/min) \times 1000 \div 3.14 \div Tool diameter: ϕD_c (mm)
- Feed speed: V_f (mm/min) = No. of revolutions: n \times Feed: f (mm/rev)

Feed selection diagram

Fig. 1 Carbon steels



P

Fig. 2 Alloy steels

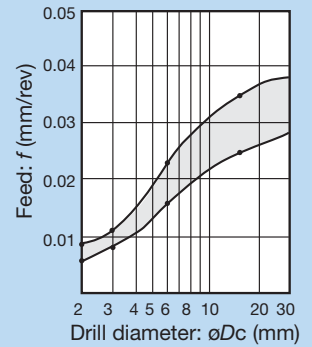
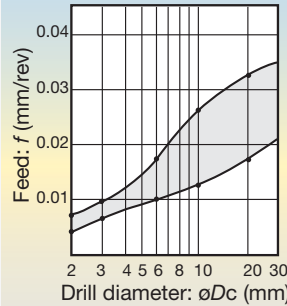
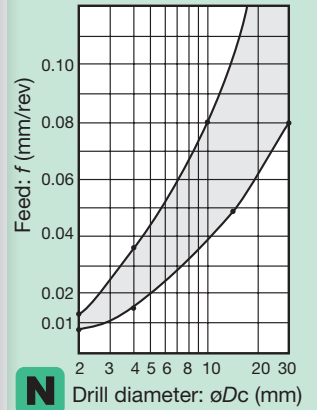


Fig. 3 Tool steels and other special steels



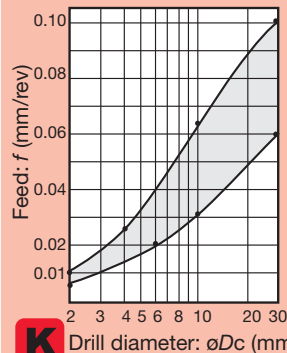
P M H

Fig. 4 Cast irons, aluminium alloys



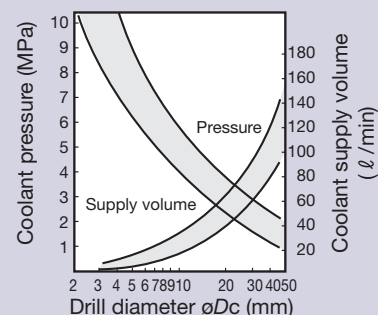
N

Fig. 5 Ductile and malleable cast irons



K

Coolant supply pressure and volume





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