

Tungaloy

Member IMC Group

Tungaloy Report No. 420-US

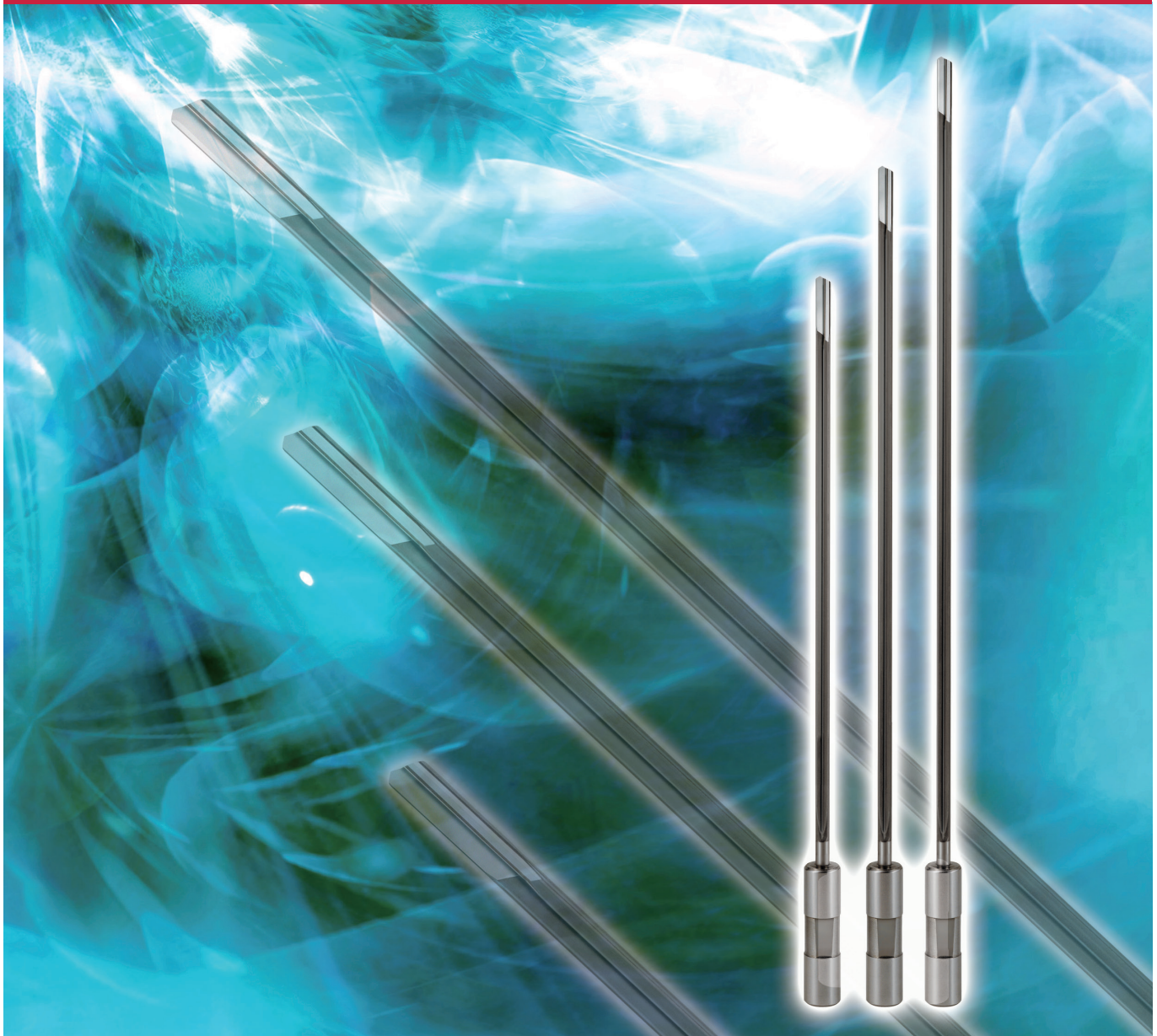
DRILLLINE Deep hole drilling tool

NEW

GUNDRILL
TUNGALOY

SLJ type -Single flute brazed Gundrills

Ideal tool for small & deep hole!



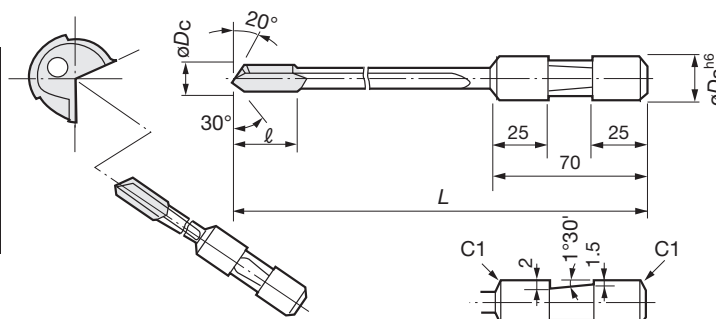
Ideal drilling tool for highly accurate deep hole!

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.

○ : Japan 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
Aluminum 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.

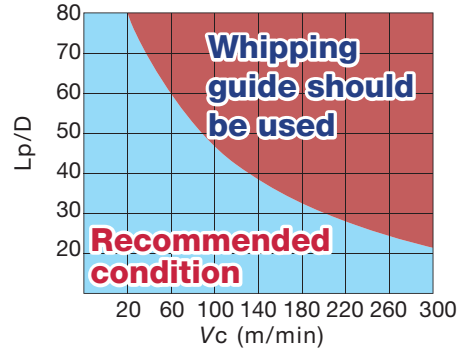
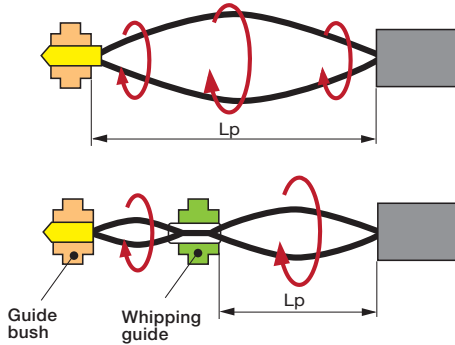
Tip length

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.

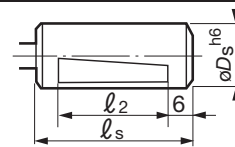
Available range of special order tool

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

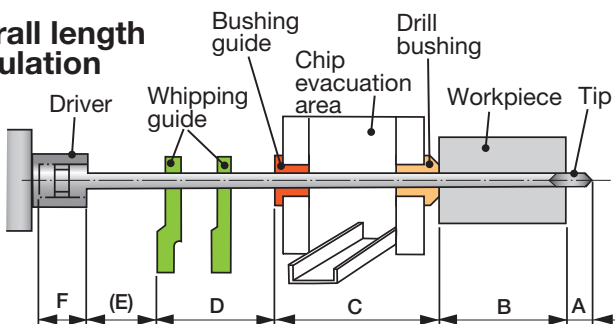
LJ - 5.0 L600 A 19.05

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	$\phi 10.99$
⑤ Driver diameter: ϕD_s (mm)	
19.05	$\phi 19.05$
20	$\phi 20.00$

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

Overall length calculation

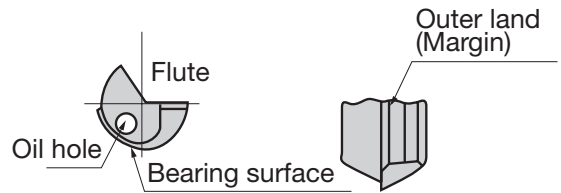
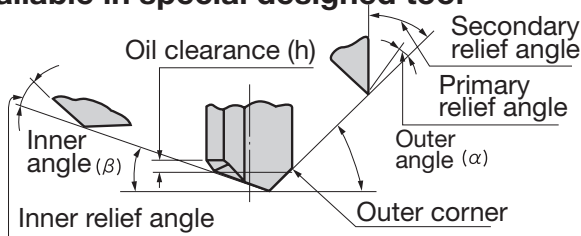


$$\text{Overall length} = A + B + C + D + (E) + F$$

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

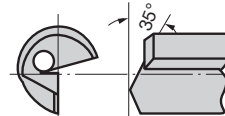
Available in special designed tool



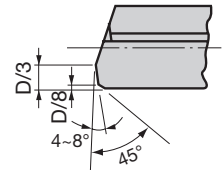
Bevel-style point geometry

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

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



Notch-style point geometry

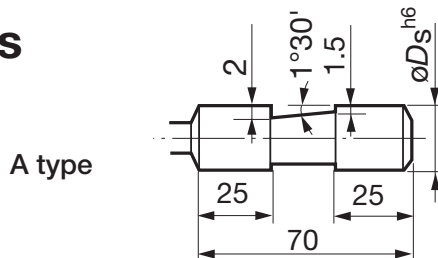


Stuck-style point geometry

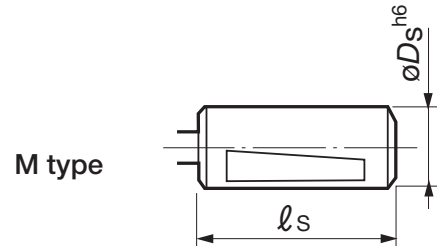
Selection of cutting edge angle

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: ϕD_c	$\phi D_c =$ 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. 1
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	
		300 ~ 350	32 ~ 38	50	
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	
		190 ~ 220		80	
		220 ~ 260		70	
Cast aluminum alloys AC3A etc. Aluminum 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

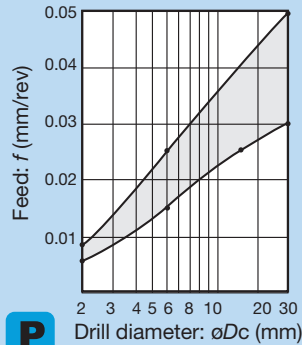


Fig. 2 Alloy steels

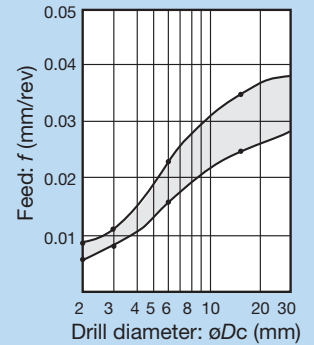


Fig. 3 Tool steels and other special steels

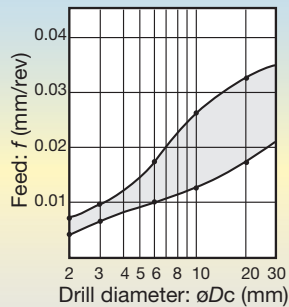


Fig. 4 Cast irons, aluminum alloys

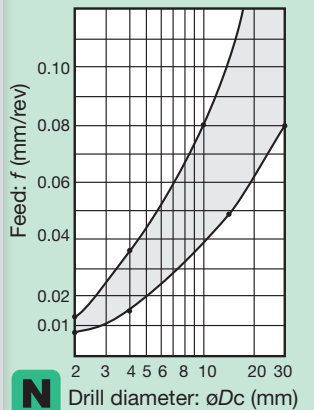
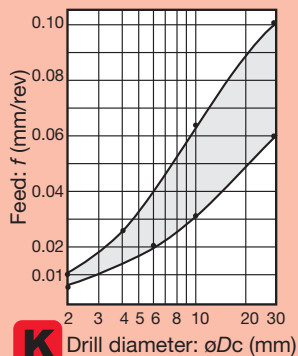
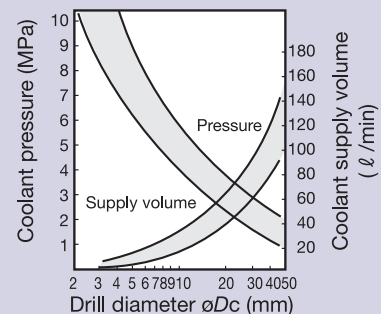


Fig. 5 Ductile and malleable cast irons



Coolant supply pressure and volume





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