

Solid drills with 4 flutes

SOLID ^{4 FLUTES} DRILL

Tungaloy Report No. 549-US

Solid carbide drills with **4 effective cutting edges** for superior productivity





INDUSTRY 4.0
FEED the SPEED!



SOLID ^{FLUTES} 4 DRILL



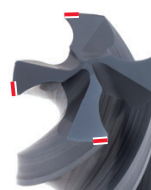
Four effective cutting edges for high drilling productivity

Next-generation drills with four flutes for super high feed drilling of cast iron



- Double feed of conventional two-flute drills
- Optimized drill edge geometry allows smooth drill entry and stable drilling operations
- Quad margins enable high hole accuracy and quality
- Available in the latest **AH9130** grade that provides extended tool life in aggressive drilling parameters

Quad margins



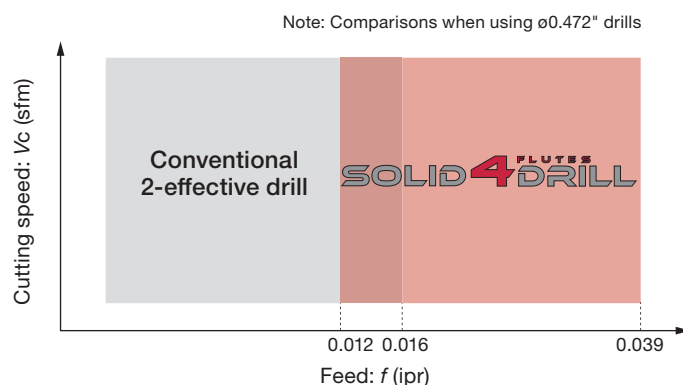
Self-centering profile



■ Unique flutes design for optimal chip evacuation for high productivity



80-55-06



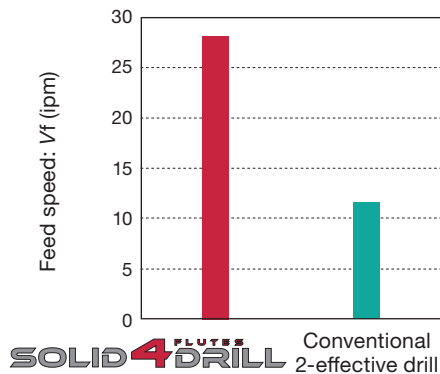
■ Four margins and a self-centering drill geometry enables high hole precision and quality

	SOLID ⁴ FLUTES ^{DRILL}	Conventional 2-effective drill
Cylindricity (μm)		
Roundness (μm)	5.085 ✓	11.21
Straightness (μm)	2.221 ✓	14.861



Tool : $\phi 0.472$ ", L/D = 3 (Blind hole)
 Workpiece material : 80-55-06
 Cutting speed : $V_c = 262$ sfm
 Feed : $f = 0.016$ ipr
 Hole depth : $H = 1.417$ "
 Coolant : Wet (External)

■ Unique cutting edge geometry allows very high productivity



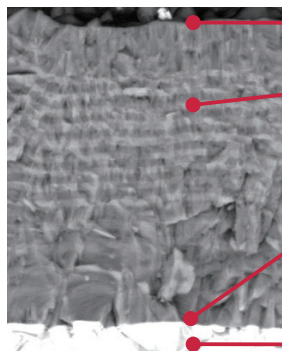
Tool	: DSQ120-036-12E3 (ø0.472", L/D = 3) (Conventional: ø0.472", L/D = 3)
Grade	: AH9130 (Conventional: PVD)
Cutting speed	: Vc = 164 sfm
Feed	: f = 0.021 ipr (Conventional: 0.008 ipr)
Feed speed	: Vf = 28.212 ipm (Conventional: 11.457 ipm)
Hole depth	: H = 0.630"
Coolant	: Wet (External)

■ GRADES

Latest coating optimized for extended tool life

AH9130

- Unique nano-multilayered coating is made possible by Tungaloy's latest coating technology, providing 3 principal features
- This coating achieves highly-balanced wear resistance and chipping resistance, also has acid resistance, resistance to dissolution, and high adhesion strength



Resistance to built-up edge

Coating layer to resist built-up edge

Resistance to wear, oxidation, and fracture

- 2 coating layers for wear and oxidation resistance
- Layered alternatively to prevent crack from propagating to fracture

Strong coating-substrate adhesion

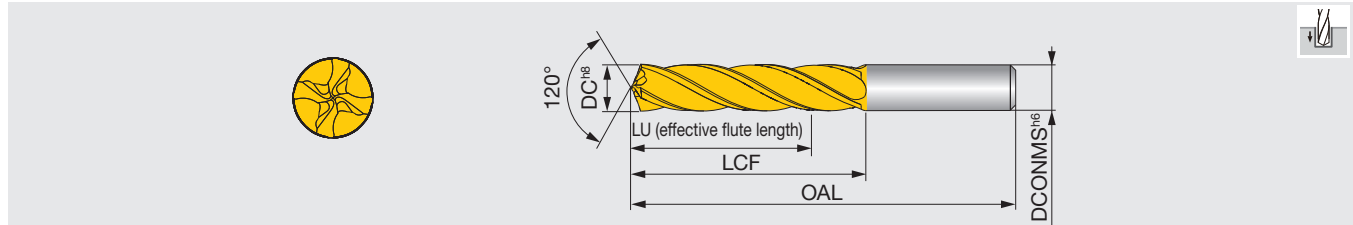
Coating is provided with strong adhesion between the coating layer and carbide substrate to prevent coating delamination

Substrate

Carbide substrate features wear and fracture resistance

DSQ-E3

Solid drill, without coolant hole, DIN shank, L/D = 3, $\phi 0.236''$ - $\phi 0.630''$

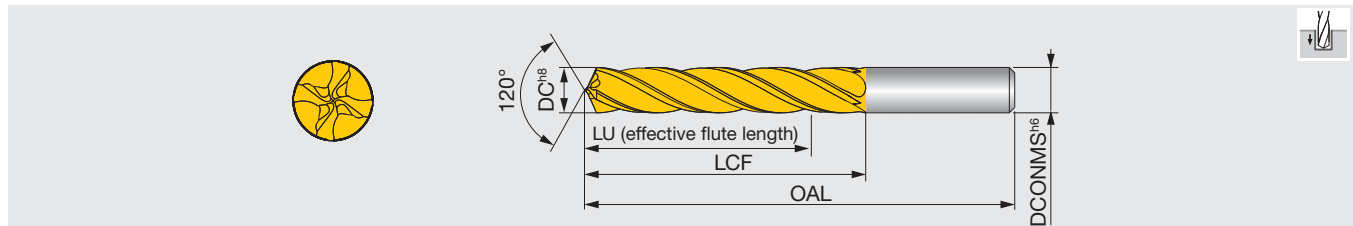


Inch	DC	AH9130	DCONMS	LU	LCF	OAL	Inch	DC	AH9130	DCONMS	LU	LCF	OAL
DSQ060-018-06E3	0.236	●	0.236	0.945	1.181	3.150	DSQ108-033-11E3	0.425	●	0.433	1.693	2.126	4.882
DSQ068-021-07E3	0.268	●	0.276	1.063	1.339	3.307	DSQ120-036-12E3	0.472	●	0.472	1.890	2.362	5.118
DSQ085-026-09E3	0.335	●	0.354	1.339	1.693	3.661	DSQ130-039-13E3	0.512	●	0.512	2.047	2.559	5.315
DSQ090-027-09E3	0.354	●	0.354	1.417	1.772	3.740	DSQ140-042-14E3	0.551	●	0.551	2.205	2.756	5.512
DSQ100-030-10E3	0.394	●	0.394	1.575	1.969	3.937	DSQ160-048-16E3	0.630	●	0.630	2.520	3.150	5.906
DSQ105-032-11E3	0.413	●	0.433	1.654	2.087	4.843							

● : Line up

DSQ-E5

Solid drill, without coolant hole, DIN shank, L/D = 5, $\phi 0.236''$ - $\phi 0.630''$



Inch	DC	AH9130	DCONMS	LU	LCF	OAL	Inch	DC	AH9130	DCONMS	LU	LCF	OAL
DSQ060-030-06E5	0.236	●	0.236	1.417	1.654	3.622	DSQ105-053-11E5	0.413	●	0.433	2.480	2.913	5.669
DSQ068-034-07E5	0.268	●	0.276	1.614	1.890	3.858	DSQ120-060-12E5	0.472	●	0.472	2.835	3.307	6.063
DSQ085-043-09E5	0.335	●	0.354	2.008	2.362	4.331	DSQ160-080-16E5	0.630	●	0.630	3.780	4.409	7.165

● : Line up

STANDARD CUTTING CONDITIONS

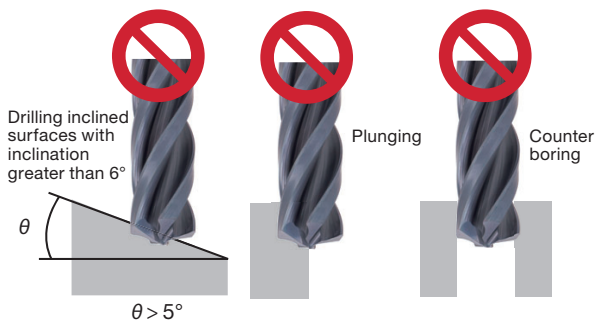
ISO	Workpiece material	Brinell hardness (HB)	Cutting speed Vc (sfm)	Feed: f (ipr)	
				$\phi 0.236'' \sim \phi 0.390''$	$\phi 0.394'' \sim \phi 0.630''$
K	Grey cast irons Class 30, etc.	~ 200	197 - 394	0.008 - 0.031	0.012 - 0.039
	Ductile cast irons 65-45-12, etc.	~ 300	197 - 394	0.008 - 0.031	0.012 - 0.039

- The cutting parameters shown in the table are a starting guideline for general machining. Values should be varied depending on the power or rigidity of the machine to be used. Optimum conditions should be selected depending on the actual chip control or damage on edges.
- When using the smaller diameter tools in each range, set the feed "f" to the lower in recommended values.
- When drilling with a depth deeper than L/D = 3, a pecking cycle or dwell operation should be considered depending on the actual chip control or damage on edges.

TECHNICAL GUIDE

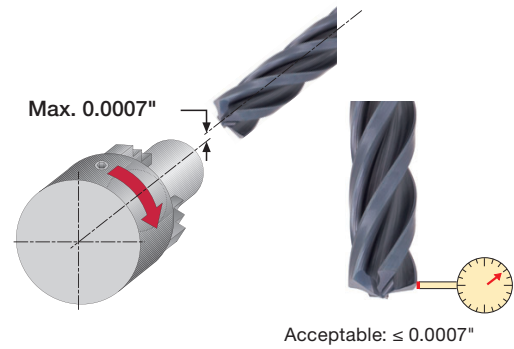
● Tool setup

Do not use for the following applications



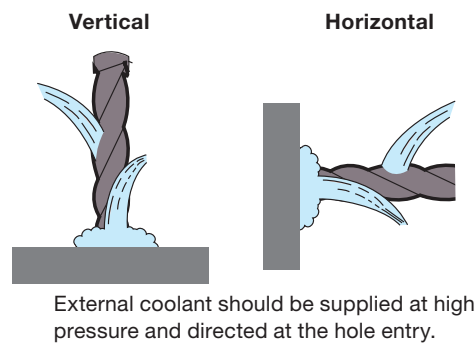
Run-out

Run-out should be less than 0.0007"



● When using external coolant supply

When using external coolant supply, ensure that the cutting fluid is directed to the hole entry at all times to facilitate smooth chip evacuation from the cutting point.



● Application range

Inclined entrance	Inclined exit	Cross holes
✓	✓	✓

Note: Reduce feed rate when entering or exiting irregular surfaces

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